American Bee Journal

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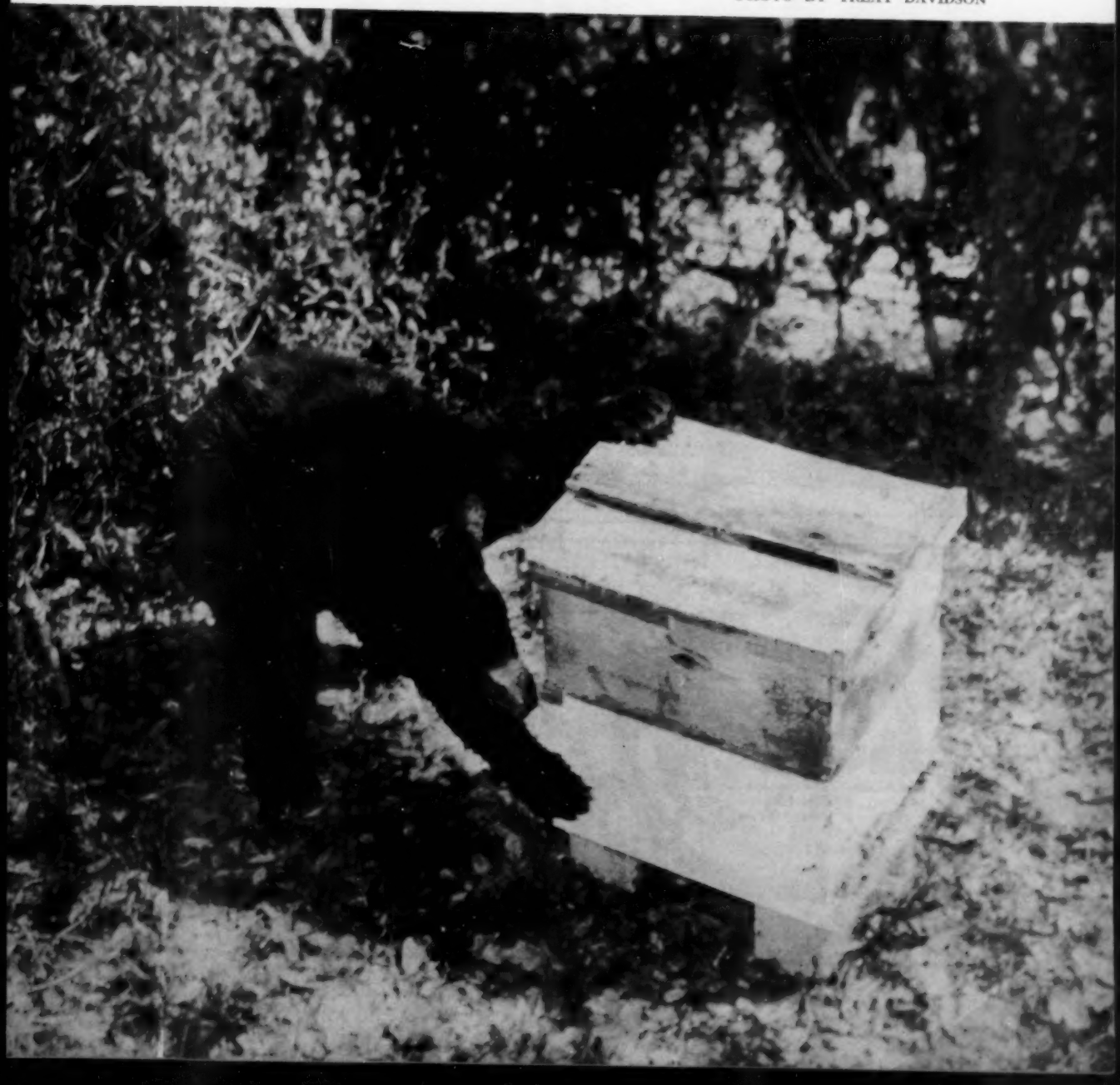

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Vol. 101, No. 8 August, 1961

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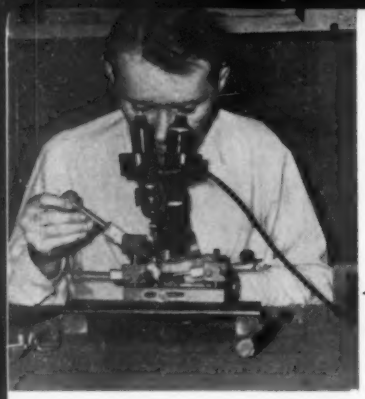


Apicultural Science

Editor, DR. WALTER C. ROTHENBUHLER
Iowa State University
Ames, Iowa

How Long Can Spores of American Foulbrood Live?*

by LEONARD HASEMAN,
Department of Entomology, Univ. of Mo.

For more than fifty years beekeepers, as well as apiary inspectors, have been asking the question, "How long do foulbrood spores live?" The usual guess has been several years. But for how many years do we now know that the spores on an infected comb do actually remain viable as proven by repeated bacteriological laboratory culture tests?

The writer's interest in this question was first aroused some forty odd years ago when some of our Missouri beekeepers, similar to the nations of the world during World War One, were at each other's throats over the whole question of foulbrood. So bitter was the issue at some of our annual beekeepers' short courses that plans were made by certain beekeepers to actually "plant" infected combs in the yard of one beekeeper here at Columbia who claimed that foulbrood was merely foul neglect and that his bees could clean up all the foulbrood they might send him. One sample of infected comb intended for this purpose was intercepted by the writer in 1924. The late Dr. Phillips, then in charge of the bee research work at Washington, D. C., found the comb to be infected with American foulbrood. The comb, along with the transmitting letter with instructions on how to "plant" it in the beekeeper's yard, was locked in the Entomology Department's fire-proofed vault where it has remained safe from harm except for a temporary attack of carpet beetles.

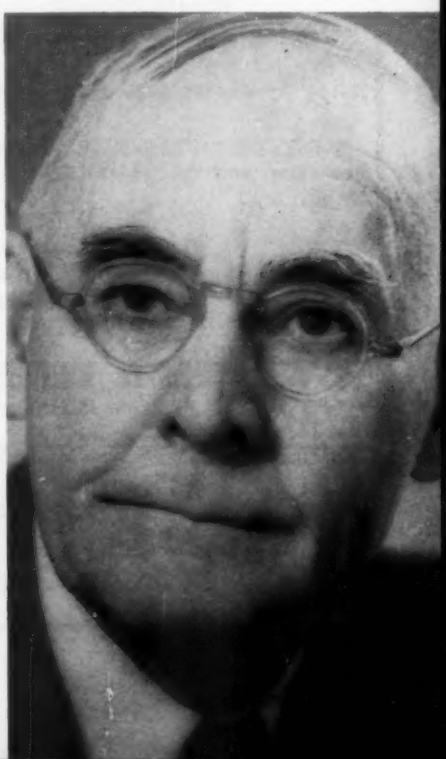
From time to time since 1924 a few infected cells have been sent first to the Federal Laboratory in Washington and more recently also to the Canadian office in Ottawa for double checking on the viability of the spores in this old comb. The different men in charge of bee disease work, when samples of infected cells have been sent to Washington, have succeeded in getting normal *Bacillus larvae* cultures from every sample. First in 1924, Dr. Phillips reported; in 1932, 1950, 1954 and 1957 Dr. Hambleton reported and in 1959 Dr. Michael cultured the organism and reported "the spore suspension indicated both viability and apparent virulence."

From every sample sent to Ottawa, normal cultures have also been secured. In 1955 Dr. Jamieson reported normal germination of spores and in 1957 and in 1959 Dr. Katznelson secured germination and normal cultures.

This means that after 35 years spores from this comb have been found to be still normal and with conditions favorable, capable of creating new infection. Just think what the poor beekeeper would have been up against 35 years ago had we not interrupted the "planting" of the comb in his apiary. On the other hand, is is possible that the intercepted comb may not have been the only one intended for "planting" for a few years later the writer observed definite foulbrood infection in the beekeeper's yard.

As early as 1916 the writer was surprised to find one of the colony in our experimental yard able to clean up a badly infected brood comb and to rear healthy brood in it for the next year or two. When we reported the incident at our next annual beekeepers' short course, both the late C. P. Dadant and Frank C. Pellett, who were the principal speakers at our short course, expressed doubt that the comb actually had been infected with American foulbrood. However, the late Dr. Phillips had made positive determination of foulbrood on the comb. A few years later, however, this colony with a daughter queen came down with foulbrood. Any hopes the writer may have cherished, at the time, about bees being able to live with "planted" foulbrood infection were promptly blighted. This experience led him to cultivate a deep respect for foulbrood and the ability of its spores to live on for years in infected combs. Also it led him to try and do something about it, resulting in our findings in 1944 that American foulbrood could be controlled effectively through medication without harm to the bees or adulteration of the honey on the grocers' shelves.

When we first announced effective control of American foulbrood through the proper use of sulfathiazole, one of the first complaints raised was that it would not kill the spores which remain for years in the combs and hives and about the bee yard. Strange to say, it is because of these very properties of the spores of foulbrood which makes chemotherapy the only safe and permanently effective protection beekeepers have against continuing foulbrood losses. Fire destroys all spores actually burned but no burning program ever reaches and kills those millions of



*Contribution from Missouri Agricultural Experiment Station, Journal Series No. 2284. Approved by Director.

long-lived, unseen spores scattered about the bee yard, in adjoining "healthy" colonies, and in the surrounding regions. Neither will sulfathiazole, but properly used regularly, it will be on hand to knock out any germinating spores before they can reach and harm the young brood. Burning and destroying contaminated combs and sterilizing equipment only makes a start at really protecting an apiary or a region from future foulbrood losses. This is strikingly shown by the fact that the last 50 years of the old burning program have still left areas and whole states with around 3% of inspected colonies showing foulbrood each year.

The writer has two colonies which have not received any sulfathiazole medication for several years and they still remain free of any signs of foulbrood. However, with the spores of foulbrood able to survive at least 35 years and then still able to germinate and start new disease, he feels that the sulfa treatment should be a regular apiary practice. This is especially true wherever in the past American foulbrood has been a problem. Some approve the treatment only as a preventive. A few advocate its use only when infection shows up in colonies. The writer urges the use of a few pennies' worth of sulfathiazole each year for every colony in the apiary. If used early in the spring before supers go on and again in the fall after the supers of honey are removed the beekeeper will not only keep foulbrood away but at the same time he need not worry about any sulfa contamination of his commercial crop of honey. The treatment in its first fifteen years' use has already largely stamped out the old fear of foulbrood.

Seventy-Five Years of Government Honey Research

JONATHAN W. WHITE, JR.
Eastern Regional Research Laboratory[1], Philadelphia 18, Pa.

Early Federal Work on Honey

Although our chemical research program on honey has been underway for thirteen years, the history of chemical work on honey in this Department goes back at least seventy-five years. Probably the first sustained chemical work with honey in Government laboratories was that of Dr. Harvey W. Wiley, of Pure Food fame. Dr. Wiley, as Chief of the Bureau of Chemistry, directed a comprehensive program of analysis of common foods, the results of which were published as the celebrated Bulletin 13, *Foods and Food Adulterants*, beginning in 1887. The shocking condition of U. S. foods thus revealed played a major part in the passage of the Food and Drug Act of 1906. In 1890 Part 6 of this bulletin appeared, subtitled *Sugar, Molasses, Sirups, Confectionery, Honey and Beeswax*. The analyses of 500 samples of open-market honey, by ten State Chemists, were given in detail and it was found that at least 37% of them were grossly adulterated. As pointed out in an *American Bee Journal* article last year, the virtual impossibility of obtaining pure honey in the latter part of the nineteenth century greatly retarded its use. Thus honey was one of the foods that was used to bring about passage of Pure Food laws in this country.

Many samples of honey of various floral types from over the country were collected for the St. Louis Exhibition in 1903 by the National Beekeepers Association. These were later donated to the Bureau of Entomology and 85 of them, plus other samples, were analyzed by Dr. C. A. Browne, Chief of the Sugar Laboratory of the Bureau of Chemistry. This work was published as Bureau of Chemistry Bulletin 110, "Chemical Analyses and Composition of American Honeys," in 1908. It was a definitive work for its time and has remained a primary source of information about the composition of honey.

Contributions of Lothrop and Walton

During the next 20 years there was no sustained program on honey in Federal laboratories; in the early 1920's William Seaman of the Carbohydrate Division investigated the color and colloid content of a large number of honey samples, but none of this work was published. E. K. Nelson and H. H. Mottern of the Food Laboratories studied the acids of honey at this time, and Dr. Nelson published a note on the flavor of orange honey. In 1928 Dr. R. E. Lothrop began chemical and technological work on honey in the Carbohydrate Division and continued for ten years, when he left honey research to become associated with the new Eastern Regional Research Laboratory near Philadelphia. Dr. Lothrop published many papers on the chemistry of honey, its analysis, the relation of its chemical and physical properties to its composition, and developed commercial methods for honey filtration that are in use today. He was succeeded by Mr. G. P. Walton who was concerned with honey analysis, especially for dextrins, developed a process making possible the use of honey in carbonated beverages at the beginning of the Second World War and devised ways to use honey in candied and glace fruit. The project was discontinued during the war. In 1948, after being away from honey research for several years, Mr. Walton initiated the present honey program at this Laboratory. After Mr. Walton's retirement in 1949 the writer has been responsible for the program.

Basic Research Program at the Eastern Laboratory

The honey research program has as a general objective the increasing use of honey. We try to do this by finding new uses, improving old ones, improving processing and by obtaining as much fundamental information about honey as possible to serve as a foundation for future technological work.

In this article I will describe our work on the analysis and composition of honey. During these thirteen years we have found many new components of honey, learned something of its enzymes, and made considerable progress in development of accurate methods for honey analyses.

The standard book of analytical procedures in the agricultural and food field is *Methods of Analyses of the Association of Official Agricultural Chemists*. It is revised every five years; the ninth edition has just appeared. At the time our current program began, the section on honey analysis carried the same procedures

[1]Eastern Utilization Research and Development Division, Agricultural Research Service, United States Department of Agriculture.

J. W. White and Jeanne Petty discuss results of paper chromatographic separations of sugars during the work on the mechanism of honey invertase action.

The automatic titrator, attended by Irene Kushnir, was used for many of the sugar analyses during the survey of American honeys.

used by Wiley and Browne so many years ago.

In 1950 we began our cooperation with the Kansas Agricultural Experiment Station, who agreed to investigate the potentialities of honey in commercial baking. It became necessary for us to analyze fifteen honey samples of different floral types which had been selected for this work.

Suager Analysis of Honey

Beginning with no knowledge of honey analysis, we studied five procedures recommended in the literature for the determination of dextrose and levulose in honey, in order to adopt one as our standard procedure. The results were sufficiently startling that we subjected them to statistical evaluation, which confirmed that there was more variation among the different methods on the same sample than among the samples of different floral origin when analyzed by any one method. Furthermore, and worse, we had no basis on which to decide which method, if any (including the "official" one) gave us the true results (1). Such a state of affairs is a challenge to the chemist, so we set out to develop better methods of sugar analyses for honey.

It had long been recognized that the old optical (saccharimetric) methods had limitations and that newer chemical methods (such as one developed by Lothrop) were preferable. However, the latter were still deficient due to the complex nature of the sugars of honey. It was only recently, when the new methods of chromatography were applied to sugars, that the way to accurate sugar analyses of honey became open to us. Whistler and Durso of Purdue had noted in 1950 that if a solution of sugars of different degrees of complexity be poured on top of a column of finely-ground charcoal and washed with alcohol solutions of increasing strength, the various filtrates so obtained contained separated groups of sugars in increasing degrees of complexity. In other words, this could provide a pretreatment for a honey solution to separate the interfering materials from the dextrose and levulose and also perhaps permit the analysis of sucrose and other sugars.

Using this selective adsorption on Charcoal, we modified chemical sugar methods to measure the sugars in the filtrate, put it on a quantitative basis (2) and began to learn something of the actual sugar composition of honey. After analyzing about twenty samples it was apparent that honey had considerably less dextrose and somewhat less levulose than previously thought, and contained a whole new (to honey) group of sugars, the reducing disaccharides. These averaged about 7.5%, and ranged as high as 14%, of the weight of honey (3).

---

(1) White, J. W. Jr., Ricciuti, C. and Maher, J. "Determination of Dextrose and Levulose in Honey. Comparison of Methods." J. Assoc. Offic. Agr. Chemists 35, 859 (1952).

(2) White, J. W. Jr. and Maher, J. "Selective Adsorption Method for Determination of the Sugars of Honey." J. Assoc. Offic. Agr. Chemists 37, 466 (1954).

(3) White, J. W. Jr. and Maher, J. "Sugar Analyses of Honey by a Selective Adsorption Method." J. Assoc. Offic. Agr. Chemists 37, 478 (1954).

This analytical procedure has provided a new picture of the composition of honey. It has been accepted first action by the Association of Official Agricultural Chemists and is included in the ninth (1960) edition of the *Book of Methods*. It has been used for honey analyses in Canada, South Africa, and Chile.

Survey of American Honeys

One effect of the new analytical method was to render obselete the results of honey analyses by older methods. This meant that the work of Browne (Bulletin 110) was no longer authoritative and pointed up the need for an analytical survey of the various honeys produced in this country. Other factors also made this desirable, such as the changes in agriculture and beekeeping methods over the intervening fifty years, not to mention the need by the food industry for more accurate data on honey. Hence in 1956, using increased funds obtained by the efforts of the honey industry, we initiated a project to collect and analyze as completely as we could samples of honey from as many sources and localities as practicable.

This we have done, using honeys from the 1956 and 1957 crops. It was a considerable undertaking, with 504 samples from 47 of the 50 states being subjected to 17 physical and chemical analyses. The nearly ten thousand results were transferred to IBM cards, analyzed, classified, and printed by machine. A Department Bulletin has been prepared giving all individual results, interpretations and analytical procedures. This should appear in print within a year.

This work would not have been possible without the cooperation of many beekeepers, extension apiarists, State bee inspectors, Professors of Apiculture and State and National organizations and their officers. The analytical work at this Laboratory was carried out by Mary H. Subers, Irene Kushnir, Mary L. Riethof, Robert B. Hager, Frederick W. Pairent, Laverne Scroggins, Allison Smith, Ronald Campbell, Dolores Boe, Oksana Panasiuk, and the writer. A summary of the results of the survey appears in a series of articles beginning in the November, 1960 *Gleanings in Bee Culture*.

Rare Sugars in Honey

With the knowledge that reducing disaccharides were present in honey in appreciable amounts, we undertook to isolate and identify these materials. With the help of such recent techniques as gradient elution carbon chromatography (4), preparative paper chromatography and infrared spectra of potassium chloride discs containing the sugars (5), we isolated and identified the following reducing disaccharide in honey (6):

Maltose:—This common diglucose sugar had been reported in honey some years ago by Elser and confirmed by van Voorst. It is the disaccharide sugar found in corn sirup.

Isomaltose:—This is an uncommon sugar, related to maltose. Its best source is from the hydrolysis of dextran, a fermentation polysaccharide used as a blood extender and industrial gum.

Nigerose:—This is a very rare dextrose-containing sugar. It had previously been isolated from "hydrol" which is the "molasses" remaining from dextrose manufacture from corn. It is also part of a polysaccharide "nigerose" produced by a mold.

Turanose:—This sugar, composed of dextrose and levulose, may be produced by splitting of the trisaccharide melezitose which is found in certain types of honeydew. Its identification in honey appears to be the first isolation of this sugar from a natural product; the same may be said of nigerose and maltulose.

Maltulose: — This sugar contains dextrose and levulose, and in structure resembles both maltose and turanose. It can be made from maltose by treatment with limewater.

Of these minor sugars, isomaltose is present in largest amount. We believe that they do not exist in nectar but are produced by the conditions that bring about the change of nectar to honey, including the presence of honey invertase, the high acidity, and the high solids content. We have not yet studied the more complex sugars which occur in honey.

The Acids of Honey-Measurement and Identity

Another of our more basic studies on the composition of honey has been of the acids present. Many years ago it was thought that formic acid was the principal acid of honey; having been added by the bee to preserve it. As more became known of the acids, the relative importance of formic acid diminished; recent belief has been that the principal acid of lemon juice, citric acid, is the predominating honey acid.

Those who have worked with honey in the laboratory or plant by neutralizing its acidity with alkali have encountered a puzzling phenomenon. Honey solutions, normally acid, show a definite tendency to revert to their acid condition when they are brought to neutrality. That this has long been recognized is shown by part of the directions for determining the acidity of honey by the A.O.A.C.—the end point is taken arbitrarily as the amount of alkali needed to maintain a pink indicator color *for ten seconds*. The rapid fading of the color shows a return of the solution to the acid state. This had been attributed in the past to production of acids from the sugars by oxidation by air or to the production of acid by an enzyme in honey.

As part of our program to learn more about the components of honey we began a study to identify the acids. During this work it was noted that while most of the sugar-free acid fractions were quite normal in their behavior during neutralization, several of them showed the same "fading end-point" that is characteristic of honey. This led us to propose that honey contained lactone. A lactone is a neutral compound that can slowly react with water (hydrolyze) to form an acid.

When we came to analyze the collected honey samples for our survey of American honeys, we developed a new method (7) for the determination of honey acidity which also provided a measure of the lactone content and a stable end-point. As we had analyzed the samples by this method, it became apparent that material of lactone nature is a general constituent of honey. It was present in all honey samples, sometimes half as much as the free acidity.

During this time, progress was also being made in identifying the acids in honey. It was found (8) that the principal acid in honey is not citric

(4) Hoban, N. and White, J. W. Jr. "Gradient Elution of Disaccharides on a Stearic Acid-Treated Charcoal Column." Anal. Chem. *30*, 1294 (1958).

(5) White, J. W. Jr., Eddy, C. R., Petty, J. and Hoban, N. "Infrared Identification of Disaccharides." Anal. Chem. *30*, 506 (1958).

(6) White, J. W. Jr. and Hoban, N. "Composition of Honey. IV. Identification of the Disaccharides." Arch Biochem. Biophys. *80*, 386 (1959).

(7) White, J. W. Jr., Petty, J. and Hager, R. B. "The Composition of Honey. II. Lactone Content." J. Assoc. Offic. Agr. Chemists *41*, 194 (1958).

(8) Stinson, E. E., Subers, M. H., Petty, J. and White, J. W. Jr. "The Composition of Honey. V. Separation and Identification of the Organic Acids." Arch. Biochem. Biophys. *89*, 6 (1960).

acid but rather gluconic acid. This is an acid derived from dextrose which can form a lactone. Thus undoubtedly all or most of the lactone material in honey is gluconolactone, in equilibrium with gluconic acid. Gluconic acid had some years ago (9) been found in a sample of "musty" honey, where its presence was ascribed to the presence of a mold known to produce gluconic acid. In our identification work the number of *positively* identified honey acids was raised from three (citric, succinic, malic) to nine (butyric, acetic, formic, lactic, pyroglutamic, and gluconic acids). Several others were not identified (8).

Honey Enzymes

Other components of honey which are of great importance in its formation and are of great interest to us are the enzymes. These have been called "biochemical catalysts." The existence of all living things depends on the action of their enzymes to bring about under very mild conditions of concentration, temperature, and acidity, processes that either require very stringent conditions to carry out in the test tube or cannot be done at all. Enzymes in honey may have been added to the nectar by the bee, may exist in the nectar itself, or may come from other sources such as pollen, yeasts, and so on. The most important of these enzymes is sucrose or invertase. This is added by the bee and brings about the change ("inversion") of sucrose in the nectar to simple sugars (dextrose and levulose) in honey. This is one of the most important changes during the conversion. Even after honey is ripened, extracted, and bottled, the invertase will remain active and can be demonstrated unless the honey has been heated in processing sufficiently to destroy it. Another important honey enzyme (for an entirely different reason) is the so-called diastase or amylase. This enzyme is one that converts starch to simpler sugars. Its relationship to honey ripening is unknown. Since it is easily measured and is of course destroyed by heating, the presence of a low level of diastase in honey has been used for many years in various European countries as evidence that it has been subjected to excessive heat, which in their opinion greatly reduces its value.

(9) Angeletti, A. "The Presence of d-Gluconic Acid In Musty Honey." Giorn. farm. chim. *81*, 533 (1932).

We are presently engaged in a study of the enzymes of honey, from both the basic point of view to learn more about them as enzymes and also from the practical side to learn the effect of storage and processing conditions on them. Some years ago we looked into the mechanism of the action of honey invertase on sucrose, finding (10) that it is quite different from yeast invertase. Honey invertase "attacks" the dextrose part of sucrose while yeast invertase has been shown by others to attack the levulose part. During its action(and no doubt during the ripening of honey) several more complex sugars are formed by transfer of dextrose molecules to sucrose or to other sugars present. We isolated one such sugar, a new trisaccharide, and proved its structure (11). We called it "erlose." Since then it has been found in honey and honeydew and in other products. In fact there appear to be (at least) two kinds of honeydew, depending on the particular insect that produces it: the more familiar melezitose type, and the erlose type (12). The former may crystallize in the honeycomb, the latter apparently not, though it is not known whether erlose survives collection and ripening by bees as does melezitose.

While on the subject of enzymes, we have used the excellent analytical method for honey diastase described by Schade, Marsh and Eckert at California, who did collaborative work on it with German authorities, and initiated its adoption as an A.O.A.S. method.

While at first glance the relationship of some of the fundamental chemical work as described in this article to the objective of increasing honey utilization may seem obscure, it has been amply demonstrated that practical advances in technology and industry must draw on such basic information. This has always been true. It means that any complete research program, even of the most practical nature, must if at all possible include a generous portion of basic work as insurance for future developments. We cannot indefinitely rely on others to do our fundamental work for us.

For example, we recently developed a method to detect the admixture of corn sirup with honey (13) based on the knowledge that certain higher sugars occur in corn sirup but not in honey. We have also developed a chemical test to detect toxic honey from laurel and rhododendron (14) based on fundamental work by Dr. E. C. Horning and his associates (15).

During the past thirteen years several chemists have been associated with the honey research program. I should like to acknowledge the competence, careful attention to detail, and willing cooperation of these individuals: Jeanne Maher Petty, Nancy Hoban, Mary L. Riethof, Mary H. Subers, Edwin E. Stinson, and Irene Kushnir.

(10) White, J. W. Jr. and Maher, J. "Transglucosidation by Honey Invertase." Arch. Biochem. Biophys. *42*, 360 (1953).

(11) White, J. W. Jr. and Maher, J. "α-maltosyl-β-D-Fructofuranoside, a Trisaccharide Enzymically Synthesized from Sucrose." J. Am. Chem. Soc. *75*, 1259 (1953).

(12) Wolf, J. P. III and Ewart, W. H. "Carbohydrate Composition of the Honeydew of *Coccus hesperidum* L.: Evidence for the Existence of Two New Oligosaccharides." Arch. Biochem. Biophys. *58*, 365 (1955). Gray, H. E. and Fraenkel, G. "The Carbohydrate Components of Honeydew." Physiol. Zool. *27*, 56 (1954). Stephen, W. A. "Some Sugars Secreted by the Woolly Alder Aphid." J. Econ. Entomol. *52*, 353 (1959).

(13) White, J. W. Jr. "Report on the Analysis of Honey." J. Assoc. Offic. Agr. Chemists *42*, 341 (1959).

(14) White, J. W. Jr. and Riethof, M. L. "The Composition of Honey. III. Detection of Acetylandromedol in Toxic Honeys." Arch. Biochem. Biophys. *79*, 165 (1959).

(15) Tallent, W. H., Riethof, M. L., and Horning, E. C. "Studies on the Occurrence and Structure of Acetylandromedol (Andromedotoxin)." Jour. Amer. Chem. Soc. *79*, 4548 (1957).

Applicability of the Holst Milk Test for AFB to Studies on Pollen, Bee Bread and Other Hive Materials

Bee bread, reported by Hitchcock to contain a milk digesting enzyme, was dialyzed through cellophane. Both the dialyzed portion in the tube and the dialyzate caused precipitation when added 1:1 to a 4% suspension of dried milk. This positive reaction was shown to be due to the acid precipitation of casein rather than to enzymatic action. Neutralized samples gave no precipitation. Thus the Holst milk test must be applied with caution to materials other than honey bee larvae infected with Bacillus larvae to avoid false positive conclusions as to proteolytic enzyme activity. (N. Patel and T. A. Gochnauer in the Bee World-Digest by Dr. F. B. Wells)

The Honey Bee Act and the Acarine Problem

A. S. MICHAEL, Entomology Research Division, Agric. Res. Serv., U.S.D.A.

The Honey Bee Act was enacted by Congress in 1922. The Act restricts the importation of live honey bees *(Apis mellifera* L.) into the United States and is a preventive measure against diseases dangerous to adult bees, particularly Acarine disease. In 1947 further restrictions were imposed by amendments to the regulations of the original law. The Department of Agriculture hopes to broaden the Act to restrict importation of all species of bees belonging to the genus *Apis.* Recent intensive surveys throughout the United States have not revealed the presence of Acarine disease, which is caused by the tracheal mite *Acarapis woodi* (Rennie). External mites closely related to *A. woodi* have been found on bees from most regions of North America. Other actions taken by the U. S. Department of Agriculture to meet current problems related to the Honey Bee Act are discussed.

Legislation enacted by the Congress of the United States on August 31, 1922, and commonly referred to as the Honey Bee Act, restricts the importation of live honey bees *(Apis mellifera* L.) into the United States. The purpose of this legislation is to prevent entry of diseases dangerous to the adult bee, particularly Acarine disease. Canada also has an Act restricting the importation of *A. Mellifera* honey bees from abroad. These honey bees can be shipped freely between the United States and Canada with the understanding that both countries take mutual responsibility for enforcing the rules and regulations relative to the importation of adult bees.

Acarine disease is caused by a parasitic mite *Acarapis woodi* (Rennie), which infests the tracheae or breathing tubes of adult bees. The invasion of the tracheae by the mites shortens the life of the infested bee, which gradually becomes so weakened that it can no longer fly. Many bees die in the field, but many others are found crawling in front of the hive unable to fly.

Acarine disease is usually spread by robbing, transferring bees, drifting, swarming, and the selling or purchasing of infested bees. The mites transfer directly from bee to bee. Therefore infested adult bees must come in contact with uninfested adult bees for the disease to be transferred. Acarine disease does not always cause the death of the colony, but if many workers become infested through robbing, the colony may be quickly weakened and killed. The disease appears to be most virulent when it reaches a new area. Honey yields from infested colonies are reduced because of the short lives and continued loss of workers harboring the mites.

Acarine disease reached epidemic proportions some years ago in England and now exists in Europe, South America, Africa, and Asia. That it could be introduced into North America is a potential danger.

Control measures developed and applied in areas where the mite is established require much labor and painstaking application. The shipment of queens, packaged bees, and the movement of colonies in North America would certainly make control difficult should Acarine disease ever become established in our large commercial holdings. Inexperience with the disease and the lack of knowledge of methods of treatment would further hamper our control efforts.

The Honey Bee Act, as originally written, permitted the United States Department of Agriculture, acting on behalf of public institutions and commercial queen bee breeders, to import queens for experimental purposes. However, the rules and regulations of the Act were later considered inadequate to prevent the introduction of Acarine disease into the United States. Therefore, the regulation and its accompanying rules were amended as of August 27, 1947, to restrict all importations of adult honey bees except those from Canada. Before recommending this change, the Department consulted with State entomologists, State bee inspectors, bee trade-journal editors, and queen bee breeders. With few exceptions, they all urged that the change be made.

In January 1959, the American Beekeeping Federation and the Apiary Inspectors of America, assembled in convention at Tampa, Florida, adopted a resolution emphasizing the potential threat of Acarine disease to beekeeping in North America. In January 1960 this resolution was reaffirmed when the same groups met at Phoenix, Arizona. The Apiary Inspectors of America indicated their desire for better information with regard to the distribution, recognition, control, and eradication of the mite. At the same time, the Federation requested the United States Department of Agriculture to take whatever measures necessary to carry out a survey in North America for the presence of *A. woodi* and if possible to bring a technician from Europe to instruct American workers in the disease caused by this mite. The Apiary Inspectors of America agreed to cooperate in every way possible to obtain field samples for this survey.

The American Beekeeping Federation also suggested that an effort be made to send a worker to Europe for a period to study the techniques now being used in the recognition and control of Acarine disease and that a policy be formulated by the Department of Agriculture in cooperation with the Apiary Inspectors of America with regard to what action should be taken in the event that the disease is found in North America.

It is quite apparent that the Department of Agriculture, the Apiary Inspectors of America, the American Beekeeping Federation, and the Canadian apiculturists all recognize the potential threat of Acarine disease to the beekeeping industry of North America. Several governments have initiated the establishment of protective embargoes in Latin America similar to the regulations applicable to North America against the importation of honey bees for the exclusion of Acarine disease. Some countries in the Western Hemisphere have only recently taken steps to organize quarantine agencies. Commercial beekeeping has expanded rapidly in Central and South America without systematic disease inspection and with uncontrolled foreign importation of bees.

Renewed interest in the Acarine disease problem has been stimulated by the discovery that the disease is in India and was found in *Apis indica* (F.), another species of honey bees, by its presence in at least three

countries in South America, and by reported cases of in-pocket importation of queen bees by travelers unaware of the governmental restriction or the danger of introducing this diease. Also, there has been an understandable desire on the part of research workers to obtain honey bees from different regions of the world for genetic and breeding research.

The Bee Culture Laboratory at Beltsville, Maryland, which provides a diagnostic service for the beekeeping industry, has consistently examined, for the presence of the Acarine-disease-causing mite, all adult bees received from beekeepers and State apiary inspectors. Samples have been submitted from every State and many foreign countries. Through this regular procedure the first recorded discovery of *A. woodi* was made in a sample of *Apis indica* from India.

In response to the heightened interest in Acarine disease, the Department of Agriculture has taken the following action: In 1959 a survey was undertaken to obtain representative colony samples from numerous geographical locations throughout the United States. No tracheal mites, *A. woodi*, have been found in over 12,000 examinations. State apiarists and university apiculturists have also examined large numbers of bees from their own States.

During this search for Acarine disease, external mites closely related to the parasitic tracheal mite *A. woodi* were found in samples of bees from most regions of North America. These external mites, which are apparently harmless to the honey bee, have been classified as *A. dorsalis* Morgenthaler, *A. externus* Morgenthaler, and *A. vagans* Schneider. These are the mites associated with the "Acarine scare" of August 1959, when a shipment from California was confiscated by Australian authorities because the bees were found to contain mites. More recently, the Australian authorities have confiscated shipments infested with mites from the States of Mississippi and Tennessee.

In all these shipments, neither the Australian nor the American authorities have been able to demonstrate the presence of the parasitic tracheal mite, *A. woodi*.

The external mites obtained during the course of the survey were transmitted for identification to E. W. Baker, mite specialist of the Entomology Research Division, U. S. Department of Agriculture. His study of these mites and of specimens of the tracheal mite has revealed a hitherto undescribed definite morphological difference between two of the external mites and *A. woodi*. The use of this character for separating the *Acarapis* species may eliminate such occurrences as the California, Mississippi, and Tennessee confiscations.

Since *A. woodi* has been found in *Apis indica*, the U. S. Department of Agriculture hopes to broaden the regulations of the Honey Bee Act to embrace all species of honey bees, including *Apis mellifera* (L.), *Apis indica* (F.), *Apis florea* (F.), and *Apis dorsata* (F.).

Action has been initiated to encourage Acarine disease research, particularly in India and Italy, were the disease exists and competent research facilities are available, and in other foreign countries where special funds are available under Public Law 480.

Plans have been completed for sending a bee-disease specialist to Europe for intensive study and observation at several of the leading laboratories specializing in Acarine disease. When he returns, this specialist will be available to assist Federal and State apiculturists in developing a quarantine and eradication policy that can be put into effect promptly should Acarine disease be introduced into North America. The policy will be submitted as a recommendation to the Department of Agriculture.

The possibility of bringing a leading European specialist in Acarine disease to the United States for several months is being explored. This specialist could advise Federal and State apiculturists as to the latest information available on the biology, diagnosis, control, and economic aspects of the disease.

The Bee Culture Laboratories of the Department of Agriculture have intensified their studies of procedures that would permit the introduction of honey bee stock for genetic and breeding purposes without importing adult bees. A successful method of preserving and shipping drone semen has been developed.[1] New breeding stocks can be introduced by importing drone semen and making three or more backcrosses to domestic stock by artificial insemination. Preliminary studies on procedures for handling eggs, larvae, and pupae suggest the possibility that they can be transported safely and by relatively simple methods.

1. Taber, S. and M. S. Blum. Artificial Preservation of Bee Semen. Science 131 (3415): 1734-1735, June 1960.

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The Seedsman's Digest announces the development of a new sweet clover by the Wisconsin Experiment Station and the U. S. Department of Agriculture. The new clover, "Denta," is characterized by a minimum of coumarin thus making it ideal for cattle feeding where formerly there was timidity on the part of the farmer to allow stock in green sweet clover.

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At present, seed is not generally available, but amounts have been put at the disposal of experimental stations in the hopes that enough for general demand may be forthcoming.

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We are informed that the watered-down version of the Agricultural Act of 1961 gives the Secretary of Agriculture the power to set up Marketing Programs for honey, lambs, turkeys, California apples and peanuts. In this sense it is an Enabling Act but the road to a Marketing Agreement and Order is strewn with many stones. Here is the race that must be won!

First, a proposed marketing order is drafted by an industry group with the help of members of the U. S. Department of Agriculture. This proposal then is submitted to the Department along with a request that a public hearing be held to consider it in detail. At the public hearing anyone may offer testimony for or against the proposal. The testimony taken at the hearing becomes the basis for the rulings and proposals next incorporated into a proposed Marketing Agreement by the Department that is published and made available. Then there is a period of time in which anyone may file objections and additional testimony, and ultimately the matter is published in the Federal Register. Now it is ready to be voted upon by the industry. To become a Marketing Order it must be approved by at least two-thirds of the producers voting and by 50 per cent of the handlers or packers.

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Others in the industry have vigorously opposed such a program. They argue that there would be marketing controls beyond that stated above; that such controls would be imposed only on honey moving in interstate shipments; that interstate shippers would bear the full expense of the program. They state that the administration and policing of such a program would be impractical and unwieldy. There are many additional arguments.

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Sideline

Editor— AYLMER J. JONES

The Hive and the Honey Bee

by **SHARON BETH CARSTENS,** Iowa Honey Queen

Hello! I'm a worker here in the colony. I couldn't help but notice you gazing through our glass hive wall. It's not proper to stare you know; but since you are already here, let me show you around. I'll have to work as we go, for we have no slackards in this hive!

I've just begun the work of nursing the larvae in the brood cells. Since I'm only three days old, I do the work of nursing, cleaning brood cells, guarding the hive, making beeswax, carrying water, packing pollen, and depositing nectar. When I get a few weeks older, I'll be able to work in the fields gathering nectar and pollen.

That large bee of a different coloring that you see is our queen. Some of the three-day old workers are ministering to her now, feeding her when she requires it and grooming her meticulously. You can see she's asking for food because she's stretching her proboscis toward the mouth of one worker. She's well taken care of, as we depend on her to sustain the life of the hive. Yes, we workers are also females, but only the queen has the ovaries necessary to lay eggs.

Our queen is a very young one, just hatched from one of our emergency cells. Since we lost our old queen suddenly, we selected the best of our brood cells, and gave them exceptional care and extra food. She was the first one to hatch from this group. As soon as she emerged, she opened the other queen cells and disposed of each larva with her deadly sting. It does sound cruel, but two queens seldom will live in the same hive together.

Our week-old queen is now preparing for her marriage flight, which will last from ten to thirty minutes. A few days after she returns to our hive, she will start laying. Most of the eggs will be fertilized and will hatch into female workers like myself.

After fertilization in flight, the drone, or male bee, will fall to earth to die or be eaten by other insects. It's just as well, since he does no work in the hive and yet eats more than his share of food. Hatched from an unfertilized egg, the drone has only one use and that is to fertilize the queen.

Whew! It is getting warm in our hive! Those workers you see rising to the alighting board will soon lower the temperature by fanning their wings, thus setting up out-going air currents. It's quite an air-conditioning system!

I'd better leave you now and help with the fanning. I hope you have enjoyed your visit to our little socialistic community. So long!

(If these few facts on bees have interested you, get the book "The Hive and the Honey Bee," edited by Roy A. Grout, at your local library for more *fascinating* reading.)

Sharon, from Blairsburg, Iowa, is 18 and a freshman at Buena Vista College at Storm Lake. She has been a 4-H member for 8 years. She was a $500 scholarship winner and valedictorian in high school. This was an essay submitted in the Honey Queen contest and chosen for its excellence.

Beekeepers in 4-H Clubs

The Southern States seem to be much more active in the promotion of bee clubs through 4-H than in the North. As a consequence the ranks of the diversified farmers contain many beekeepers. Imagine how the ranks of the beekeepers would swell if all 4-H members were made cognizant of the place of honey bees in the farm picture. In North Carolina alone (one of the active states in bee work owning to the efforts of W. A. Stephen), there are 168,080 4-H Club members, a good sprinkling of whom know beekeeping.

Advice to a Young Beekeeper

Just a word of advice to a young beekeeper hoping to become a commercial operator someday. Work for the best commercial man you can find for two or three years. The knowledge, experience, and connections gained are worth far more than the actual wages received. In this way you learn what to do as well as what not to do and it is the most profitable way of learning the business. I know. It's what I did.

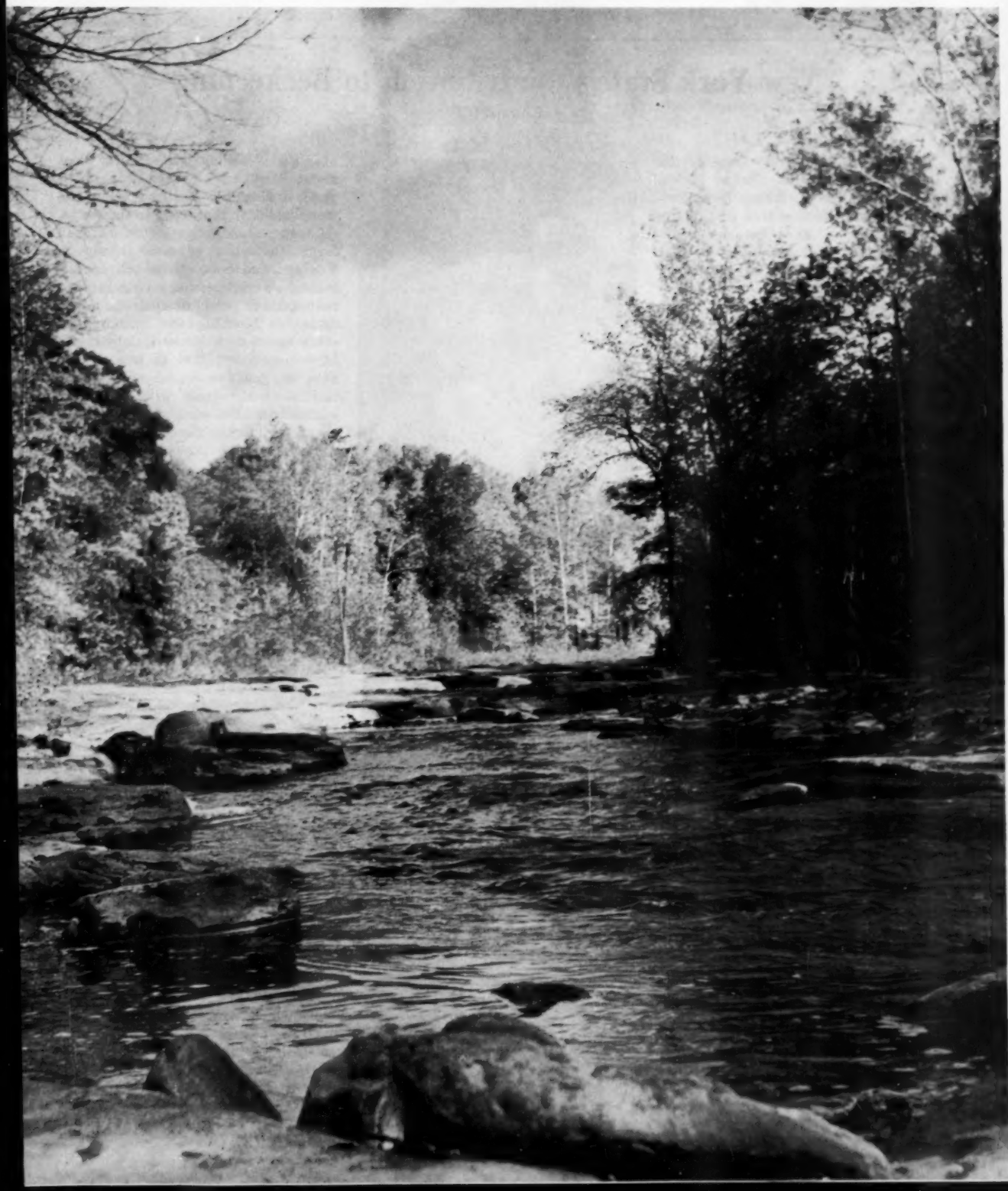
Victor Mesley
Kemptville, Ontario

The Historic Northeast

Edited by E. J. Dyce and Roger A. Morse, Cornell University, Ithaca, New York

New York

A typical stream in central New York State.



The Historic Northeast

EDITORS

E. J. DYCE ROGER A. MORSE

Cornell University

Part III - New York

New York State's Contribution to Beekeeping

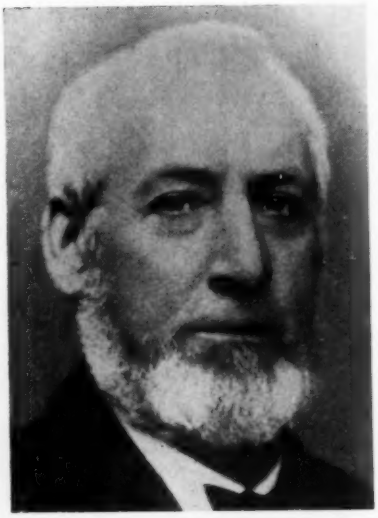
E. J. DYCE

New York, similar to some of the other Northeastern States, is a natural habitat for honey bees. Evidence of this is the fact that many swarms which have become established in walls of buildings or trees live for years without any attention. Most areas in the State have a constant supply of minor and major plants which secrete both nectar and pollen from early spring until late fall. Some of the most important sources are skunk cabbage, willows, maples, dandelions, yellow rocket, fruit blossoms, locusts, clovers, bird's-foot trefoil, basswood, alfalfa, buckwheat, goldenrods and asters. Most of the light honey is produced in a rather wide belt of land running from Buffalo to Albany. Other good light honey areas are located along the St. Lawrence River and in the Champlain Valley. Most of the fall honey crops from buckwheat, goldenrod, and asters are produced in the central and southern half of the State.

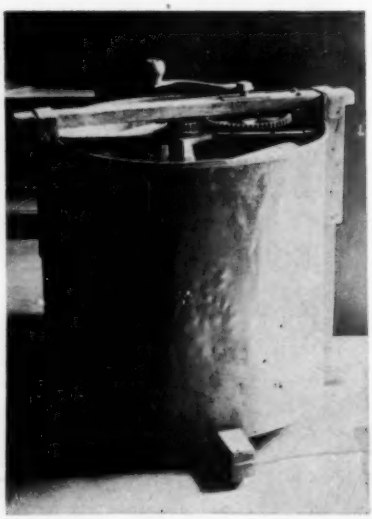
Early Leaders

It is generally recognized that honey production on a commercial scale was pioneered by Moses Quinby in Montogomery County at St. Johnsville, New York, which is about 50 miles west of Schenectady on Route 5. Moses Quinby was born in 1810 and published his book, "Mysteries of Beekeeping Explained," in 1853. It is an interesting coincidence that L. L. Langstroth was also born in 1810 and published his book, "The Hive and Honeybee," in 1853. Apparently neither knew the other was writing a book. Quinby was a practical commercial beekeeper while Langstroth was interested mainly in fundamental research which led to his great discovery of the bee-space in 1851.

Moses Quinby started beekeeping in 1828 and inspired many others to make a living from bees. One of his students, Captain J. E. Hetherington of Cherry Valley, New York, kept about 3,000 colonies and was publicized during his time as being the most extensive beekeeper in the world. At any rate, Hetherington shipped large quantities of comb honey to England and conducted much experimental work in improving apiary management and equipment. Aside from his teaching and encouraging other beekeepers, Moses Quinby clearly demonstrated that it was profitable to produce honey on a commercial basis even with primitive equipment. He also contributed a great deal to the development of the smoker and the extractor. Among the items in the Beekeeping Museum at Cornell University are two of Quinby's smokers and his original extractor which is considered to be the first and oldest, all metal extractor made in this country.



Moses Quinby, inspiring New York beekeeper, started beekeeping in 1828. He originated the bee smoker.



Original Quinby extractor, considered to be the first metal extractor made in this country. It is now in the Cornell University museum.

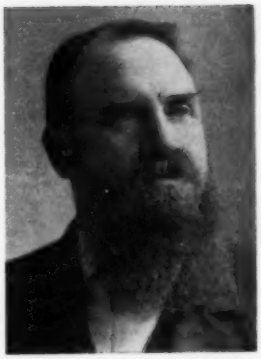
Other early New York State leaders in beekeeping were G. M. Doolittle and Julius Hoffman. Doolittle was born in 1846 and carried on his beekeeping activities in Onondaga County, near Bordino, New York. He is well known for his books and articles in the bee journals on queen rearing and general colony management. Hoffman was born in 1838 and kept bees chiefly in Montgomery County near Canajoharie, New York. Hoffman is known best for his work in developing the self-spacing frame. Among the more recent New York State men of note was Dr. Lloyd R. Watson of Alfred, New York who was born in 1876. While completing his Doctors Degree at Cornell University he developed and demonstrated in 1926 the basic technique by which queen bees could be artifically inseminated. He made the instruments and described the technique which laid the foundation for much of the research on bee breeding which is being undertaken at the present time.

Among other students of Moses Quinby was W. Lamar Coggshall who was born in 1852 at West Groton, New York. His sons and grandsons are still actively engaged in the beekeeping industry. They are A. L. Coggshall and his son Dr. W. L. Coggshall, Wax Workers, Inc., Ithaca, New York, B. B. Coggshall and his son Millard Coggshall of Gorton, New York and Minneola, Florida, Burel Lane of Trumansburg, New York and Roger Lane of Trumansburg, New York and Dunedin, Florida.

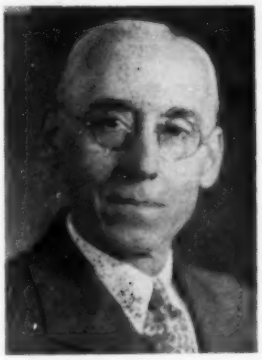
Beekeeping Work at Cornell University

In 1924 the late Dr. E. F. Phillips, who was in charge of the beekeeping work at the United States Department of Agriculture, Washington, D. C. left this position to come to Cornell University to establish an active program of teaching, research and extension work. He remained at Cornell until he retired in 1946. Being so well known, Dr. Phillips attracted students from all parts of the world. No other institution in the world has produced more students in apiculture with Masters and Doctors degrees during the past four decades. Over the years there has been a steady improvement in laboratory facilities at Cornell, including the use of over one hundred colonies for experimental work.

During the past five years the number of Graduate Assistantships for students in Apiculture at Cornell University has been increased from one to three. Each assistantship which leads to an M. S. or a Ph.D. degree provides an annual stipend of about $2,600 plus free tuition. These assistantships provide an excellent opportunity for young men with Bachelors degrees to do graduate work at little or no personal expense. An alarming number of our State and Federal Apiculturists will retire within the next few years and it appears as if there will not be enough young properly trained apiculturists to fill these positions. This is of vital concern to the entire beekeeping industry and this fact should be widely publicized.



Gilbert M. Doolittle, father of the Doolittle system of queen rearing by grafting.



Lloyd Raymond Watson, Alfred, New York, originator of instrumental insemination of queen bees.

To facilitate the beekeeping work at Cornell, Dr. Phillips devoted much of his time to developing an outstanding beekeeping library. To honor him for this work, the library was given his name and an endowment in excess of $10,000. The interest from this money is used to purchase books and other beekeeping literature as they become available and also to insure the perpetual care for the library. The library consists of thousands of books, bulletins, pamphlets and volumes of beekeeping journals. It is recognized as the most valuable and extensive collection of beekeeping literature in the world. Some notable collections have been included, such as the entire library of Moses Quinby, all books known to remain from the libraries of L. L. Lansgtroth, Dr. C. C. Miller and Dr. John Anderson, the Evard French Library, and a large collection of first editions. Among the most valuable items are Langstroth's hand-written journal, his letter press book, and a diary of Moses Quinby.

Some of the most valuable parts of this library have been obtained by exchange with foreign institutions and libraries, and there is constant need for extra copies of older books and all volumes of beekeeping journals. Such items are welcome and should be addressed to the Office of Apiculture, Department of Entomology, Cornell University, Ithaca, New York. All items in the library except special old treasures are avail-

W. L. Coggshall, West Groton, early commercial beekeeper (1852). Four sons and two grandsons are still actively engaged in the beekeeping industry. He had about 3,000 colonies in New York and he also had bees in Cuba, Colorado and New Mexico.

One of A. L. Coggshall's apiaries at Ithaca, New York.

Dr. Everett Franklin Phillips in action and Dr. E. J. Dyce during the Second World War.

able to serious users through inter-library loan service. This service is available at any public library.

The Gorton Cooperative

In 1940 the Finger Lakes Honey Producers Cooperative was established at Groton, New York mainly to pack the large crops of buckwheat honey and to find a good market since there was little demand at that time for buckwheat honey. This organization, which is a true beekeepers' cooperative, not only accomplished this objective but also pioneered in this country the process which was developed at Cornell University for preparing pasteurized, finely granulated honey for market. Much of the honey packed for the retail trade as well as for bakers was and still is being sold in the finely granulated form. Many people, who do not care for honey in the liquid form, find granulated honey very enjoyable and the demand appears to be increasing each year.

Honey Butter

In 1941 the Honey Butter Products Corporation was started at Ithaca, New York. This organization has been packing a high quality mixture of pure honey and dairy butter using a secret process which was developed in Canada and licensed to this organization. The shelf life of this pack is very good. Thousands of dollars have been spent by other organizations in an effort to duplicate the pack but so far all have failed. This organization processes about one million pounds of honey-butter each year and the product is a credit to both the beekeeping and dairy industries.

Size of Industry

In New York State, approximately 12,000 persons keep about 175,000 colonies of honey bees. The annual production averages around 10,000,000 pounds of honey and about 175,000 pounds of beeswax, which is higher than the average per colony for the entire country but not so high as that of some of the Northern and Western States. New York ranks first among the Northeastern States in honey production and usually ranks among the first seven states in the U. S. A. in number of colonies and in production.

Most of the honey produced in New York State is consumed within the State. In fact, much light honey produced in other states finds a ready market among the more than 15,000,000 people living in this State. The baking industry uses large quantities of amber and dark honey from various parts of the country.

In and around large towns and cities there are numerous beekeepers' associations. In the New York City area, for example, there are some very active associations that meet once a month. Few of the members of these associations own more than three or four colonies, yet all of them are enthusiastic promoters of honey. They not only pack and sell their own honey locally but some of them buy honey from commercial beekeepers and sell it to their neighbors. The honey which they pack and sell is usually amber in color and their neighbors like it. Since honey is largely an impulse item these organizations doubtless teach thousands of people to enjoy honey who would otherwise not be sufficiently interestered to buy it in the stores. Such organizations should be encouraged.

Census data indicate that there has been a great decrease in number of colonies as well as the number of beekeepers in New York State since 1900. These figures also show that fewer beekeepers are operating more colonies. This trend for more production by fewer producers has been increasing for several years in beekeeping as well as in other agricultural industries. Several beekeepers in New York State are now operating units ranging from one to three thousand colonies. With improved management and stronger colonies it is doubtful if the total number of honey bees available for pollination in the State has decreased much since 1900.

Front view of the Finger Lakes Honey Producers' Cooperative at Groton, New York.

Pollination

New York State ranks second in the production of apples, pears, peaches and cherries in this country. The average value of these crops in this State amounts to over $30,000,000 annually. To pollinate these and other crops around 10,000 colonies are moved into the orchards each year, chiefly by commercial beekeepers. These beekeepers know the science of building up and preparing colonies for pollination work in early spring and they have the equipment to move the bees on short notice. Without the help of these commercial beekeepers insufficient pollination soon would become a serious problem.

Owing to the amount of insecticides and fungicides now used to control insects in the orchards, colonies of honey bees are no longer able to survive or maintain their populations if left in the orchards throughout the year. The colonies therefore must be kept in locations at least two or three miles away from the orchards and moved into the orchards just for the blossoming period. This work and expense of moving bees is just as great for the fruit grower, who tries to keep bees, as it is for the beekeepers. In an effort to reduce expenses many fruit growers over the years have attempted to keep bees for pollination services. In nearly every case the venture has resulted in failure. Failure usually results from the difficulty of finding men who are not afraid of bees and who know enough about colony management to keep the colonies in good condition.

Colonies used for pollination in the orchards require special attention and care. If they are too strong in bees or have too much reserve honey in their hives they will likely swarm, if conditions are favorable for nectar secretion. If the colonies are too weak in bees they will not do an efficient job of pollination. If the colonies do not have enough honey and the weather is unfavorable they will starve. It is a very costly procedure to feed colonies or control swarming when they are spread throughout the orchards. In addition to the problem of moving bees in and out of the orchards, especially when the ground is soft, there is the ever present danger of colonies being greatly weakened or killed through poisoning. For these reasons few beekeepers are eager to rent bees to orchardists for pollination work.

Pollination is the greatest contribution of honey bees to our economy. Agriculture is becoming more and more dependent on honey bees for this work. Recent surveys in New York State indicate that 90 percent of orchard pollination is provided by honey bees. Legumes and many other crops also depend largely on honey bees for pollination. The basic reason for New York State carrying on a broad, teaching, research and extension program is to help maintain a progressive beekeeping industry large enough to adequately pollinate our agricultural crops.

Louis F. Wahl of Chili Center, New York, and his horse and buggy used for honey sales in the early 1900's.

J. B. Merwin, Prattsville, New York, for whom Editor G. H. Cale worked in about 1920. His son Charles is still managing the bees.

The rest of the New York articles will appear in the September issue, to be followed by the Pennsylvania coverage; then by the smaller states of the area in later issues. Harold Merrell's article on beekeeping practice in Wolcott, New York, follows on the next two pages.

Beekeeping Practices Revised

HAROLD A. MERRELL, Wolcott, N. Y.

In each region of this great country of ours, there are different beekeeping practices in use to best take care of the pollination and nectar gathering of the area. I'm quite sure each beekeeper has different problems so that no two beekeepers would do their beekeeping in the same way. My own beekeeping here in New York State has centered around pollination for a good many years. I have made small changes each year in beekeeping practices. These have added up during the 35 years I have been keeping bees, until now my procedures are quite different from those I used during the 1920's. I hope some of you beekeepers may be interested in hearing about these changes.

One of the changes we have made is in increase. We bought packages but decided they did not help in pollination. We used to divide colonies after the main honeyflow but finally concluded we got better results if the division was made earlier in the season. I never could understand why, unless the later increases did not have enough reserve pollen for early spring brood rearing. They had large clusters and ample stores but many died. Some 15 or 20 years ago we started using double screens for increase and the advantages of this have been good. With brood above the screens, queen acceptance was fine. There was no robbing or chilled brood; manipulation was fast and there was a minimum of loss from bees going back below.

Wintering has been a big problem of ours. We have used heavy packing as advocated by Dr. Phillips and Professor George Rea. This method has given way to packing in groups of 8 and this to a light packing on top and bottom with each colony packed singly. Some seasons in the recent past our wintering loss has been high. This past winter we made a slight opening between upper and lower hive bodies through which the bees could fly. Our wintering was the best we ever had. I hope this simple procedure is as helpful as it seems to be and our wintering losses will be of little consequence. Our costs for packing will be down both in labor and material.

Disease has never been a serious problem in our yards, probably because we have spent a great many man hours of labor on attempting to eradicate it. During the past few seasons labor costs have gone up and it seemed necessary to cut the hours used this way. Several of my friends urged me to try sulfa as a preventive. I felt forced to do so and, to my surprise, our losses from disease were lowered. Moreover the amount of time used for inspection was cut more than I anticipated. This practice is not accepted well in this area, but I had to either accept it or cut the size of my operation. I think I have used this practice long enough to feel safe in continuing it.

Our method of requeening has not changed very much. We used to rear our own queens but find it too costly in this locality. We buy our queens from a southern shipper who has sufficient capacity to insure an adequate supply. In the last 15 years there have been only three times when I haven't been able to get as many queens as I needed at the time I wanted them. These delays were short ones.

We have used cells for requeening but with our short season I do not like the delay and uncertainty. Last season we had a high mortality among our newly introduced queens but fortunately supersedure did not occur until a rival was ready to take over, so we suffered no great loss. Our procedure is to use the shipping cage with the candy end up and placed in the brood nest. A hole is pierced in the candy plug with a match.

Taking off honey, according to many of my contemporaries, has changed from the use of escapes to the use of cabolic acid. I have gone from escapes to pads and back to escapes. It doesn't seem to me to make much difference in the number of bees we get in the honey house. Since we check each colony for disease and queen condition before taking off white honey, escapes fit in well in our operation and the honey can be taken off any time in the next few days at our convenience. There is little robbing until we load the honey on the trucks. By that time the colony is prepared to defend itself and we have few colonies robbed out during honey removal. We use a truck with screened sides and cover as tightly as possible on top with a canvas.

My bee yards are quite different now from those of 35 years ago. Many of the yards are all-season yards. I try to improve the driveways of some each year with gravel for the bad spots. This pays real dividends for we go into our yards more frequently than most beekeepers because of our pollination business. We have increased the number of colonies in each yard over the years. We used to have 20-30 colonies in some yards but now it is 30-60 with most yards maintained at 50 colonies. With several men working a yard, we find small yards are too time consuming. There is no apparent loss of honey production either. We like to have the yards concentrated in an area. This cuts travel and labor costs for we can work all day in an area by traveling only 2 or 3 miles from one yard to the next. I operate 3000 colonies and have 65 yards.

Our extracting operation changed first from a trailer to a bee house in the yard and then to a central extracting plant where we can have heat and light. We try new labor saving techniques each year and we still have a long way to go. Pallets and hand trucks were a big first improvement. Our truck backs up to an unloading platform in the honey house. This is most helpful in loading and unloading honey in supers. I hate to think of the number of uncapping machines (and their cost!) that we have used and replaced. At present we are using a Bogenschutz of ancient vintage. It is not entirely satisfactory but we have nothing better.

It was a great saving of labor to change from 60 lb. tins to 55 gallon drums for the honey. The latter is filled by use of a new type molasses pump.

When Howard Myers proposed this change at our Co-op, I felt it would never work, but it has cut container cost by nearly 1c a pound. I think in our plant the labor cost has been cut by this change almost ½c a pound.

Labor continues to be a big problem. We need about four extra men during the pollination season plus a couple of high school boys. Getting two thousand colonies inspected and transported in and out of orchards located anywhere within a radius of fifty miles of my home (100 miles from more distant yards) at best is hard rush work. Each year our labor

Pallet and hand truck used by Merrell for handling hives and supers.

Old extracting house common in the buckwheat area.

costs creep up, yet I cannot increase my rental charge too much or there will be no market for my service. Perhaps that wouldn't be too bad after all! One of these days I just might do that and retire.

Something New in the White House

From "The Periscope" (Newsweek) two subscribers have sent in this item, Stanley K. Brown of Canoga Park, California; and John R. Loegering of Minneapolis, Minnesota.

WHITE HOUSE—Something new—honey—has been added to the Kennedy breakfast menu. House Speaker Rayburn, who has eaten honey every morning for 40 years, complained he wasn't served any at JFK's breakfasts for Congressional leaders. A supply was ordered for Mr. Sam and now it's on the table regularly.

God Save the Queen

"La Belgique Apicole" tells the story of Lord Cecil de Hatfield having ordered a queen with instructions that he be notified a day or two before her arrival. This was done that the queen would arrive by train at 3:15; telegram. Imagine Lord Cecil's surprise when arriving at the station to be confronted with most of the people of the vicinity, who, advised by the station agent anticipated the arrival of the Queen of England.

Indiana Prize Worker

According to the Indiana June News Letter the LaFayette Regional Science Fair was a big success. In the entire group David (last name not mentioned) won one of two prizes. As beekeeper, he got one of the two trips offered to the Science Fair at Kansas City for his display of actual flowers in bloom and the resulting nectar secretion. He is a 16-year old.

Grasshoppers in 1961

A correspondent from Saskatchewan warns that 1961 is to be a grasshopper year for that province. A mild winter and a dry one he says have allowed the hoppers to prepare for their harvest in 1961.

The Commercial Operator

Editor - S. JOAQUIN WATKINS

Honey Production With Packages

by HENRY W. HANSEN

Over a number of years at beekeepers' meetings and conventions, the question always comes up, "How come that you can build up package bees as fast as you do?"

There are several factors involved, and next to conserving heat within the hive, an ample pollen reserve is one that cannot be overemphasized.

In Dr. Farrar's experiments in Madison, Wisconsin and my own beekeeping experience it has been demonstrated time and again that pollen plays a very important part in building up packages. This is why when bees are wintered and a number are lost and replaced with packages, there is not a pollen reserve on hand to give to new packages. As a result the package build-up is disappointing.

By killing the bees in the fall, I have clean combs with ample pollen, and that is one of the important factors in building up packages in the spring.

Now let's explore the economics of package bees vs. wintered colonies. In our territory, which is an intense farming community with land selling for $400 to $500 an acre, we do not have the possibilities of big crops because of lack of pasture. Therefore we have to try to run our bees as efficiently and as economically as we can.

In my opinion package bees are the answer. When I kill my bees, I extract 45 to 50 pounds of honey that would be needed for wintering. Figure that honey at 12c, which at today's market is fair, means a saving of $5.40 to $6.00. Say we can lay down a 2-lb. package with queen in Dakota City for $4.50. Extra queens will bring the average cost up an additional $.25 or a total of $4.75.

Costs	
Package delivered	$4.50
Extra queens, prorated	.25
	$4.75

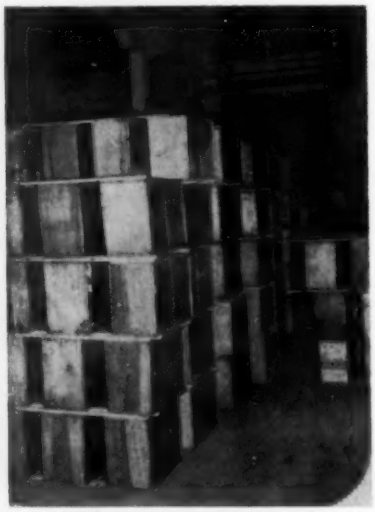
Savings	
45 to 50 lbs. honey at 12c	$5.40 to $6.00
⅓ less labor	
50% longer life of equipment	

The biggest hurdle in package beekeeping is getting your packages on time from a reliable producer with good queens. We have partly solved this, and I emphasize partly, by selecting good queen shippers, ordering bees a year ahead of time, and going south after them and hauling them back.

Then again you will find that you get excellent queens from one source one year and have them fail next year. Weather conditions down South have a lot to do with it and sometimes the shipper lowers his standards.

I understand that Dr. G. H. Cale, Jr. is coming out with an article on

Shaking the packages in the South.



Packages being loaded in truck.

Hiving package in the North on combs with honey and pollen. Note division board feeder.

Packages nicely hived and queen being introduced. Now a good spring flow and nice weather completes the job.

why our supersedure in southern queens is as high as it is, and that it is fairly easy to remedy after the cause is recognized.

We have been getting a truckload of nucs every year for a number of years, and we have found that we can get as much or more honey out of a 2-lb. package as from a four frame nuc. Of course, there is less queen trouble in a nuc, but then you also have extra labor for swarm prevention.

Dakota City
Iowa

Path of the Package Pioneers

by ALAN FROST

The trucking of bees in packages from California to Alberta today is not too hazardous. There are still, however, some problems facing the shippers during the fifteen hundred mile trip across four states and two provinces. Fast motor trucks have cut the time from the Sacramento Valley to central Alberta to thirty-four hours. This entails two men on the truck, one sleeping and one driving, with stops only to eat and gas up.

The first packages to come into Alberta from California by truck were brought in by Mr. Riddell in an old Federal. His route was via the 7000 ft. Donner Pass crossing the Sierra Nevada Mountains. There are sections of the road not the smoothest today, but what of yesterday, just imagine the jolting the poor bees were submitted to then. It was extremely interesting to travel the pioneer package route this past spring with the biggest Western Canadian hauler. Our G. M. C. tandem unit carried a van which is 24 feet long, 8 feet wide and 8 feet high. Herein can be fitted up to 2,000 packages.

Weather was kind to us on leaving Calgary in Alberta and until we reached the Sacramento Valley. Mind you we suffered a slight dose of sunstroke (after our severe northern winter) when we reached California where the temperature soared to 82 degrees.

But 60 miles south of Calgary, guess what? Yep, a blow-out! Still we figured better to get it now than when we were loaded with bees. Alberta roads are mostly good but just before leaving the province and for some forty miles inside B. C. frost damage was severe and the going mighty rough. I was somewhat amazed after this to read a big roadside sign saying "ROUGH ROAD AHEAD" however we did survive this section.

Mounted up front, as pictures show, is a cleverly designed sleeping compartment fitted with air mattress and sleeping bag. Notice the small window where the occupant can look out. On first riding up there I was not too sure this seeing where one was going was a good idea. Our van, as mentioned earlier, reached an overall height of about 13 feet. Now looking out of this window and moving along at 50 M.P.H. the many overhead rail bridges, phone lines, etc. all look from my way-up perch to be 3 feet lower than the van. Such was the fright, that I continued to duck long after I had fallen asleep.

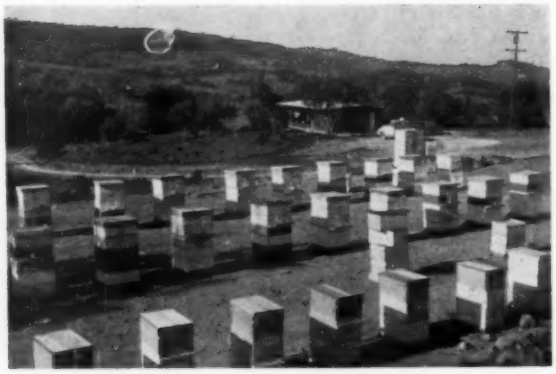
Idaho presented the first lovely green grass. What a pretty sight after 6 months of snow and leafless terrain in Alberta. Always having to watch costs, the hauler was happy on reaching Spokane with empty tanks to find a gas price war on and he filled with 120 gallons at 14 cents less than the regular price. This made up for the tire blow-out so early in the trip. I was delighted with a gas station sign which said "If you can't stop, wave." Such courtesy is catching.

There's scenery aplenty on the run down the Columbia River and soon the skyline is dominated with majestic Mt. Adams, Mt. Hood and farther south Mt. Jefferson. The beautiful eastern Oregon cities of Bend and Klamath Falls are a delight to visit.

Alan Frost has been Provincial Inspector in Alberta but has now returned to Echuca, Australia, to resume beekeeping there.

Moyie Lake, British Columbia, with the last signs of winter on the trip south to California.

Mt. Shasta (14,162 feet) from Highway 99. Van is 34 feet long, 8 feet wide and high. W. Rogers, Calgary, operator.



Holzberlein's queen yard near Auburn in foot hills of Sierras. Queens from here headed some of the packages.

Package bees from Art Banta being installed by W. Rogers April 21 in Calgary, Alberta.

Due south now towers the mighty Shasta and package haulers welcome this age old Californian land mark. Coming or going Shasta says, "goodbye come back again," or, "welcome to California."

We checked with the package suppliers and rested awhile in the green and flowering Sacramento Valley. Here is remarkable evidence what man can do with water.

We visited with some of the legendary names in Californian beekeeping - Banta, Foster, Holzberlein, Wenner, Walker, Thomas, Whitcombe, Kohnen and others. Men who know bees love to talk with other men, who know bees (especially visitors).

American democracy once again supported our cost cutting as there was also a gas price war on in Red Bluff. Needless to say we readily accepted another 120 gallons of low price regular.

Bill Rogers, my host package hauler, made five trips to California and we are pleased to relate that the gas price war continued at the two points mentioned for another month.

All too soon our sojourn in the Valley came to an end and we were faced with the serious business of loading the packages for the fast run home.

We began about 6 P.M. in the evening and carefully placed the orders in the best position for quick delivery in Alberta. The evening was cool and we completed the loading at Cottonwood at midnight. The most important equipment on the van, thermometers, there are four, two extend some 8 feet back from the front, one at floor level and one near the top. Both these can be read from the cabin. Two more are placed on the sides, one gives a reading about the center of the load, the other tells the outside temperature. Temperature is controlled by a series of vents, front, sides, back and top. These are opened or closed at will to maintain a steady warmth. A bright full moon guided us up the long ascent over Shasta. Down the other side the smooth running G. M. gathered speed and a peculiar thing happened. Up top, partly asleep, I was figuring how many bees do we have on, well, we had approximately eighteen hundred 2 lb. packages. This at about 5000 bees per lb. Should make eighteen million bees. About this time the van seemed to be floating along with a weird side to side movement. Suddenly it dawned on me, all the 18 million bees are flying at once in their packages. I had heard it said that a bee can carry many times its own weight, well this was it, the consignment of lively inmates was actually carrying our G.M.C. truck. Boy we were really saving gas, but we may have to get bigger feed cans placed in the packages to compensate for the extra fuel the bees use in carrying the van. Say, the count was wrong, I forgot the eighteen hundred queens, now how much weight can a queen carry? Fortunately, at this moment, a hammering on the sleeper door brought me back to reality and to wakefulness.

Package bees from Homer Park, installed April 15, and headed by prolific queens, resulted in 8 combs of Jumbo brood by June 1. Here Inspector Everett Allen examines colonies operated by Bob Asher, Brooks, Alberta.

Strong coffee and bacon and eggs helped to dispel the flying bees theory, but such are the things that one thinks about when hauling package bees.

We made the run into Calgary in 34 hours without mishap, and the entire load was later delivered to beekeepers without loss.

But say, fancy five trips. One maybe would dream of bees fitted with jets to propel us over the mountains and into the north in a few hours. For the hauler it's a tough business. He has tremendous responsibility and has considerable cost to meet. Package hauling calls for experience. The men must be 100 per cent fit and most of all they must be patient and able to think clearly to cope with the many troubles that arise.

It's an interesting trip. You should go along some time. Just once, mind you.

Desert Pollination Service

Desert Pollination Service, Inc., with principal office to be in Phoenix, Ariz., has filed articles of incorporation listing $200,000 authorized capitalization to engage in the business of furnishing bees for the pollination of growing crops, and all business including, but not limited to, dealing and contracting with any persons, associations, partnerships, or corporation which may own or control either bees or growing crops.

Incorporators include Darrell B. Bruner, 1909 E. Cherry Lynn Rd.; and Jane M. Bruner, both members of the board of directors.

Ernest W. Fair
Boulder, Colorado

Fun For The Family

***Editor*— Pat Diehnelt**
Rt. 1, N83, W13799, Fond du Lac Ave.
Menomonee Falls, Wisconsin

SCRAMBLE — CROSSWORD — RECIPES

Just couldn't hold Pat back. She's a bit older here. What to do when she's a grandmother (maybe with wrinkles)?

COVER CONTEST

Pat and your editor have been conniving on a new kind of contest for 1962. Pat wanted to tell you about it in July. No room. Here it is. The new cover design for 1962 has already been made. Centered in it is a frame. In that will be a picture of a beekeeper's daughter, contest winner of the month. Good cash prize. Any kind of good picture. May use runners up too. Why not think about this and send your pictures to Pat real early. Tell her what month you are trying for.

THE JULY SCRAMBLE ANSWER

Here in their bright metropolis of flowers the banker bees are busy with their gold (Frank Dempster Sherman).

THIS MONTH'S SCRAMBLE

owh tillet uyo ownk abtou het eag ouy ivle ni fi ouy anfcy htat nehoy si teresew tanh hsac ni danh

The September winner in the recipe contest is Mrs. Arnold Perlick of Suring, Wisconsin, with a recipe for Honey Pumpkin Custard. Once more space prevents publication so the recipes will have to be delayed until later.

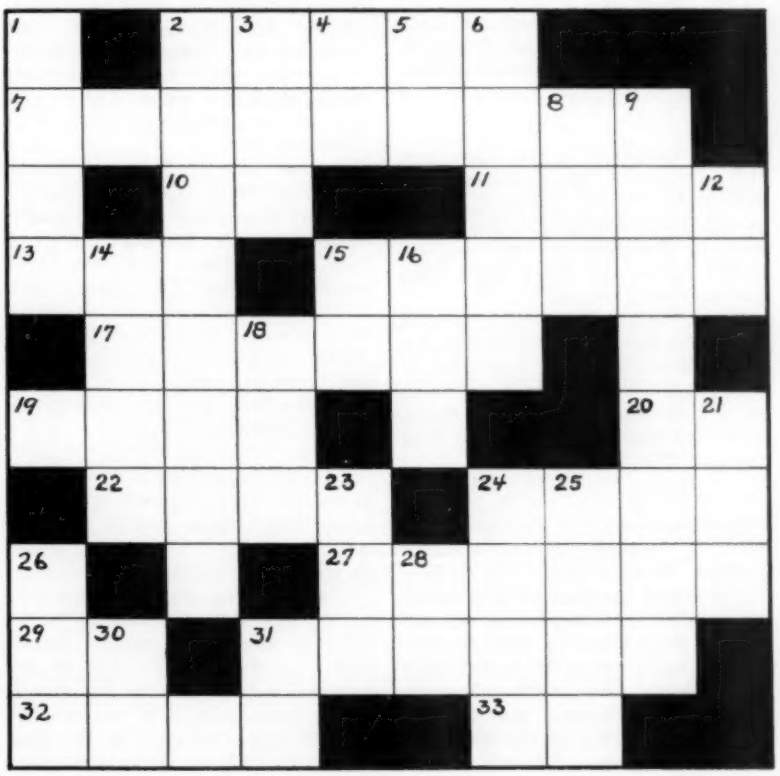
August Crossword Puzzle

ACROSS

2. Maturing _____ needs pollen
7. Author on chem. properties of pollen
10. Boy's nickname
11. Ireland
13. _____ Hunter
15. Edible tuber
17. Pieces of pollen
19. Mammal
20. Preposition
22. Four _____ in anthers
24. Argonauts ship
27. Part of stamen bearing pollen
29. Buddist monk
31. Dustlike grains
32. Flower with large pollen grains
33. Iowa (abbr.)

DOWN

1. List of actors in a play
2. Pollen
3. Returned (abbr.)
4. Two vowels, but not a word
5. Bone
6. Foods regularly consumed
8. Macaw
9. Pollens rich in _____
12. Negative
14. Grows old
15. 3.1416
16. A unit
18. Segment of a circle
21. Instead of
23. Annamese measure
24. Volsunga Saga monarch
25. Saturn's 5th satellite
26. Sash
28. National League (abbr.)
30. Conjunction connecting words
31. Postscript (abbr.)



Your Questions Answered

EDITOR— **W. W. Clarke, Jr.**
204 Ag. Ed. Building
Penn. State University
University Park, Pa.

• *Question from*
Wilbur W. Acker
Troy, Ohio

I am a novice beekeeper and I have about 18 colonies of bees. Last year on Labor day I was given 5 hives of bees and then this summer (1960) they did not make any honey at all. But I did not like them at all so I raised some queens and requeened 3 of them this summer and in the spring I was given a swarm of bees, and at the same place I was given a box of bees. Well, the box I put in a good hive and the swarm in another. Now what I would like to know is this. The two hives I did not requeen and the box and swarm all started to take right off and make honey and raise brood just like a good colony. Last month when I checked them they were in pretty good shape with a good store of honey and brood. Then today I checked them and they did not have any honey at all. I mean they were empty of honey. But they had plenty of brood in all stages and they did not look like they have been robbed out at all, but like they had eaten all the honey.

Could you tell me what has happened?

Answer

Your complaint is not uncommon this year. Many beekeepers report a very light crop of honey. During a period in which there is no honeyflow, even in the summer, the bees are forced to use the honey which they had previously stored.

If your colony is headed by a good queen and there is food available, the bees will see to it that any brood in the hive will be provided for. I think all of your honey has gone into brood. You may find it necessary to feed the bees this fall.

**Question from*
Harry B. Steward
**Corinna, Maine*

I wintered my bees with a tarred paper wrap and a ⅞ inch top entrance. They all came through very good. What I would like to know is, now that they have started to bring in pollen, should I close the top entrances to keep the heat in the brood chambers?

Answer

You should close the top entrance in May but not to retain the heat. Little or no heat is lost through this entrance. However, it should be closed to cut down on confusion when you are working the bees, and also to get them to use the bottom entrance. Less pollen seems to be stored in the supers if the bees use the bottom entrance.

**Question from*
Oliver Dismuke
**Memphis, Tenn.*

Has anyone published a color pictorial of the different races of bees? I am interested in obtaining such a book.

Answer

I do not know of a publication that contains all of the races of bees in color. *The World of the Honeybee* by Colen G. Butler, published by the MacMillan Company, New York, has two color plates *Apis mellifera* and *Apis florea.*

The World of Bees by Gilbert Nixon, published by the Philosophical Library, Inc., New York 16, New York, has one colored plate of *Megachile senex,* and many of the races are in black and white.

**Question from*
Claude Jones
**Lewiston, Idaho*

Would it be practical to use a milk Pasteurizer for heating honey? I have seven colonies and have three years' experience. This year I took off two-hundred pounds of honey. I don't plan to have more than ten colonies so I don't expect to process any large amount of honey. I have in mind a two gallon size Pasteurizer with an agitator.

Answer

I do not think it would be practical to use the milk Pasteurizer to heat honey. The idea is good in that you can control the heat, you can speed up the heating process by the agitator, and you may speed up cooling, but I doubt that this machine is the thing to use. It has several handicaps: (1) There is no gate on the bottom for bottling; (2) the size is hardly large enough when you consider the cost (this would be less than 25 pounds of honey each time); (3) I doubt that the agitator is built well enough to handle honey; (4) aluminum is not the best material for honey containers; and (5) you have no way to handle 60 pound cans.

I would recommend that you make a double boiler affair out of stainless steel which may be used for heating two or three 60 pound cans as well as for processing the honey. E. J. Anderson had plans for such a unit in the March 1958 issue of American Bee Journal, pages 188-190.

**Question from*
A. H. Craig
**Rome, New York*

How would you recommend removing burr comb from welded wire queen excluders?

Answer

Burr comb can be removed from welded wire queen excluders by placing the excluders in a solar wax extractor, or a dry heat chamber, or by boiling them in lye water. I think the easiest would be the boiling lye water method.

**Question from*
I. Frye
**St. Catharines, Ontario*

Please give me information about the management of bees in a greenhouse for the pollination of cucumbers.

Answer

Mr. E. J. Anderson reported several years ago that you can get effective pollination of cucumbers in the greenhouse by placing the colony against the outside of the greenhouse with a large opening provided to the inside of the greenhouse and a smaller opening in the other end of the hive to the outside. Under these conditions, the bees could gather nectar and pollen in excess of that provided by the cucumbers alone.

Sugar syrup and pollen substitute were fed to the colony when and if needed. No mention was made of the size of opening but the inside hole should be almost full size and the outside one only an inch or two.

MEETINGS

Program of the Eastern Apicultural Society

3-Day Convention, August 10, 11 and 12
Univ. of Connecticut, Storrs, Conn.

Thursday, August 10

9:00 A.M.—Registration all day until 10:00 P.M. North Campus Men's Dormitory.

12:30 P.M.-1:15 P.M.—Lunch, Whitney Hall Cafeteria, Building 43.

1:30 P.M.-4:00 P.M.—Tours of University Campus and College of Agriculture.

3:30 P.M.—Demonstrations in Beekeeping—"We Want You to Ask for It," William J. McCormick, Vice-President, Eastern Apicultural Society, Stratford, Conn.

6:00 P.M.—Dinner. Whitney Hall Cafeteria, Building 43.

6:00 P.M.-9:00 P.M.—Registration: Life Science Auditorium, Building 32.

7:00 P.M.—Executive Board Meeting, Life Science Building, Room 22.

8:15 P.M.—Organizational Remarks. Life Science Auditorium, Building 32.

8:30 P.M.—Illustrated Lecture—"Bee Hunting" and "Tupelo Honey" by Eugene Keyarts, Madison, Conn.

7:00 P.M. - 8:00 P.M.—Organizing Honey Show—Mr. Harold L. Kelly; Organizing Gadget Show—Mr. Milo Bacon; Organizing Book Booth—Mr. Gary Rowland and Mr. Carleton C. Hubbard; In Life Science Building, Room 115.

Mrs. M. Louise Yates, Secretary-Treasurer of the Eastern Apicultural Society.

Friday Morning, August 11

7:00 A.M. - 8:30 A.M.—Breakfast, Whitney Hall Cafeteria, Building 43.

8:30 A.M.-4:30 P.M.—Room Registration, North Campus Men's Dormitory.

8:30 A.M.—Day Registration, Physical Science Building, Room 150.

9:00 A.M.—Auditorium, Room 150, Physical Science Building 37. Meeting Called to Order—J. Peter Johnson, President, Eastern Apicultural Society, New Haven, Conn.

9:05 A.M.—Invocation. Rev. Carl Webb, Glastonbury, Conn.

9:10 A.M.—"Welcome." Dr. W. B. Young, Dean and Director, College of Agriculture, University of Connecticut, Storrs, Conn.

9:25 A.M.—Response and President's Remarks.

9:30 A.M.—"Connecticut Agriculture and Natural Resources." Joseph N. Gill, Commissioner of Agriculture, Conservation and Natural Resources, Hartford, Conn.

10:10 A.M.—"About an Amateur Beekeeper and the Story of a Book." Roy A. Grout, Editor of the book, "The Hive and the Honey Bee," and Associate Editor of "The American Bee Journal." Hamilton, Illinois.

10:50 A.M.—"Wintering Bees in Norfolk, Conn." Dr. Cameron A. Reud, Norfolk, Conn.

11:00 A.M.—Women's Field Trip: "Herb Garden" and Lunch at "Caprilands," Conventry, Conn.

11:10 A.M.—Demonstration: "Assembling Hive Equipment." Edwin A. LaBrake, Woodbridge, Conn.

12:30 P.M.-1:15 P.M.—Lunch. Whitney Hall Cafeteria, Building 43.

Friday Afternoon, August 11

Auditorium, College of Agriculture, Building 42.

2:00 P.M.—Pesticides and the Honey Bee." "Further Findings on the External Bee Mite." Dr. Frank R. Shaw, University of Massachusetts, Amherst, Mass.

2:40 P.M.—"Sugar Content of Major Honey Plants." Dr. Robert S. Filmer, Rutgers—the State University, New Brunswick, N. J.

3:00 P.M. Women's Tea. Student Union, 2nd Floor, Room 208, Women's Auxiliary, Connecticut Beekeepers Association.

3:20 P.M.—"The Bee Culture Exhibit at the Shelburne Museum," Shelburne, Vermont. Enoch H. Tompkins, Burlington, Vermont.

3:25 P.M.—"The Adult Diseases of

Harry A. Powell, President, and Mrs. Powell, Secretary, of the Connecticut Association, officers of the host association.

the Honey Bee." Dr. A. S. Michael, Bee Culture Laboratory, U.S.D.A. Beltsville, Maryland.

4:15 P.M.—Demonstration: "Using Laughing Gas (Ammonium Nitrate) in Beekeeping." Paul W. Voight, Bridgeport, Conn.

6:30 P.M.—Dinner, Whitney Hall Cafeteria, Building No. 43.

7:00 P.M.—Delegates Meeting, Member Associations. Life Science Building, Room No. 153.

1962 Host State Caucus Meeting. Men's Dormitory Lounge.

8:45 P.M.—Square Dancing. Hawley Armory, Orchestra, courtesy of the Connecticut Beekeepers Association.

Saturday Morning, August 12

7:00 A.M.-8:30 A.M.—Breakfast. Special tables for Apiary Inspectors, Honey Packers, Manufacturers' Representatives, Educators, and Presidents and Officers of Beekeepers Associations. Whitney Hall Cafeteria, Building 43.

8:15 A.M.—Symposium for Officers of Member Organizations. Mr. Porter H. Evans, Morristown, N. J. Life Science Building, Room 201.

8:30 A.M.-1:00 P.M.—Registration. Life Science Auditorium, Building 32.

9:00 A.M.—Meeting called to order. Life Science Auditorium, Room 154.

9:05 A.M.—"Bees and Beekeeping." George J. Abrams, University of Maryland, College Park, Maryland.

9:30 A.M.—Women's Field Trip. "Hillandale Handweavers, Inc.," Pomfret, Conn.

9:30 A.M.—"Winter Packing," Dr. Norman E. Gary, Cornell University, Ithaca, New York.

10:00 A.M.—"The Preparation of Liquid and Crystallized Honey for Market." Dr. E. J. Dyce, Cornell University, Ithaca, New York.

10:40 A.M.—Business Meeting. Report of Site Committee and selection of site for the 1962 meeting. Election of Officers.

11:45 A.M.—Demonstration: "What to Avoid When Buying Bee Equipment," Emil Pagan, Windsor Locks, Conn.

12:15 P.M.—Convention Photograph. College of Agriculture, Building 42.

12:30 P.M.-1:15 P.M.—Lunch. Whitney Hall Cafeteria, Building 43.

Saturday Afternoon, August 12

1:30 P.M.—Announcements. Life Science Auditorium, Building 43.

1:35 P.M.—"Containers, Commercial and Gift, for Packaging Honey." Edwin J. Anderson, The Pennsylvania State University, University Park, Pennsylvania.

2:10 P.M.—"Roadstand and Roadside Selling"—Dr. R. O. Parrish, formerly of University of Connecticut —now Agricultural Economist, U. S. D. A., Washington, D. C.

2:40 P.M. "Making Beekeeping Pay" —Panel. Co-Chairmen: Alfred J. Baptiste and Dr. James I. Hambleton; Panel Members: Prof. George Abrams, Prof. Edwin J. Anderson, Dr. E. J. Dyce, Dr. Raymond O. P. Farrish, C. F. Peterson, Chester H. Niles.

6:30 P.M.—Banquet—Whitney Hall Cafeteria, Building No. 43. President J. Peter Johnson Presiding; Aylmer J. Jones, Malden, Mass., Toastmaster; Guest Speaker—Dr. James G. Horsfall, Director of The Connecticut Agricultural Experiment Station, New Haven, Connecticut.

Vermont Association
North Hero, August 26th

The annual meeting of the Vermont Association, Inc., will be held on August 26. The site of the meeting will be the summer home of Mr. and Mrs. Edward Hazen at North Hero, Grand Isle County. All persons interested in beekeeping are invited to attend. Those attending usually bring a picnic lunch.

Enoch H. Tompkins, Sec.
Shelbourne

Pennsylvania Beekeeping Short Course
Pennsylvania State University
August 21 - 25

Dr. P. W. Burke, Ontario Agricultural College, Guelph, Canada; Professor Edwin J. Anderson and W. W. Clarke, Pennsylvania State University, are instructors in the 16th Annual Beekeeping Short Course of Penn State.

The course will be held August 21 to 25 on the main campus of the University. Any individual 16 years of age or older is eligible to attend the Course. Individuals below 16 years of age will be accepted if they are accompanied by a responsible adult.

The course covers both the theory and practice of beekeeping. Approximately one half of the time will be in the classroom, while the other half will be in the laboratory and in the five bee yards of the University. Those enrolled should bring their own equipment so they may develop their skills under the supervision of the instructors.

Included in the instructions will be such subjects as Secrets of the Hive, Making a Start in Beekeeping, Inspection of the Laboratory and Its Equipment, Colony Activities and Characteristics, Care and Introduction of Package Bees, Spring Management, Races of Bees, Comb Honey Production, The Story of Beeswax, Enemies of the Honeybee, Pollination, Swarm Control, and Extracted Honey Production.

An application blank and any other data may be secured from the Director of Short Courses, 211 Armsby Building, Pennsylvania State University, University Park, Pennsylvania.

Midwestern Association
Stilwell, Kansas, August 13th

The Midwestern Association will hold its Annual Picnic at the farm home of Chas. Webb, Stilwell, Kansas, Sunday, August 13. Stilwell is on Rt. 69, south from Kansas City. Directions will be given at Stilwell.

Come early, bring a picnic lunch and be prepared for a good time. Contests will be held with worthwhile prizes for the winners. The honey judging will feature prizes for the best chunk, comb, and extracted in three divisions—light, very light and amber. So doll-up your new honey and bring it along.

Everyone welcome. Bring your family and friends. See you at Chas. Webb's, Stilwell, August 13.

James A. Worrel
Secretary

Middlesex County (Mass.)
Westford, August 26th

The Middlesex County Association will meet at 2 p.m., August 26th, at the home of Charles Helmboldt, Lowell Road, Westford. This is a favorite spot for our meetings. While fathers and uncles look over the hives, the children ride in the tractor trailer and the wives enjoy the lovely garden. After the meeting everyone is invited to see the 4-H Fair in town.

Beekeepers may be interested to have the new address of our president, John Furber, who has moved to 70 Plainfield Ave., Newton, New Jersey. Mr. Alfred Olsen, Towell, Road, Concord, Mass., takes over the duties of Mr. Furber. Good luck to John and Mildred in their new location.

Betty Carlson,
Corres. Sec.

Northeastern Kansas Association
Kansas City, Kansas, Sept. 3rd

The Northeastern Kansas Association will meet Sept. 3rd at 2:30 p.m. for the regular meeting at the home of Mr. and Mrs. Nick Rodina, 2726 North 38th St., Kansas City, Kansas. Mr. Connie Miller of Kansas City will speak on the law of the honey bee. Everyone is invited. Refreshments will be served.
Mrs. Bert M. Parrish
Secretary

Illinois State Fair
Springfield
August 11 - 20

"Never underestimate the power of a female" is an ancient axiom that is demonstrated to perfection in the world of the bees. One queen bee controlling thousands of bees proves what a female can do. This display of "power" may again be seen at the Illinois State Fair in 1961.

All bees will be enclosed in observation hives to give people a close look without getting stung, assured Carl Killion, of Paris, superintendent of the show.

Comb honey, frames of honey for extraction, and extracted honey will be divided into white and amber classes for the show. Chunk honey, designs in comb honey, and commercial shapes and art designs of beeswax may also be seen at the exposition.

All articles in the bee show must have been grown or produced in Illinois by the exhibitor or his authorized agent. Junior and non-professional exhibitors have separate classes, with all entries being due July 20. Bees and Honey judging Friday, Aug. 11, by Dr. W. E. Dunham, London, Ohio.

Honey Cookery judging 9 a.m. Friday, Aug. 11, and Saturday, Aug. 12, at 9 a.m. by Mary Perisho, 411 E. Wood St., Paris.

Cook DuPage (Ill.)
Arlington Heights, August 20th

Our Association will hold the next meeting, Sunday, August 20 at the apiary and home of E. A. Meineke. This is always a treat for our members to meet at the beautiful grounds of the Meineke home and to inspect the well kept apiary of 90 some colonies and see honey sold to the public as it should be in attractive containers from one of the finest sales rooms. You will also see Meineke Honey Candy which is known far and wide.

At this time the program is not complete but you can be assured that it will be a worth while program.

The meeting will start at 2:00 p.m. and anyone interested in bees and honey is cordially invited to attend. You folks from other parts of the U.S.A. who might be passing thru please stop and meet our group.

Mrs. Klebes, our hostess, says the usual pot luck by the members and coffee by the Association. Please bring table service also chairs and tables.
Ralph O. Klebes
Publicity
St. Charles, Ill.

Obituaries

L. T. FLOYD

Canadian beekeepers learned of the death of one of their fine old beekeepers, L. T. Floyd, on May 23, last.

L. T., as he was affectionately called by his many friends, served as provincial apiarist for two provinces, starting his career as apiarist and chief inspector in New Brunswick. After a few years, he moved to Manitoba where drier climate made working conditions to his liking. He served the provincial government as chief inspector from 1922 to 1944 during which time Manitoba became a leading province in honey production. This came about in a large part due to the extension program under Mr. Floyd's direction, which advocated the extensive use of package bees, a practice still the principal system in use.

Retiring from government service in 1944, Mr. Floyd, always a person who enjoyed a challenge, took up beekeeping in a semi-commercial way at Austin, Manitoba, making his residence there until 1958 when he chose to return again to the hills and valleys of his native province. He made his home with a sister, Mrs. John Woods, at Hampton, New Brunswick in his final years.

Mr. Floyd will be remembered for his Irish temper and quick wit which frequently created lively situations at trade conventions both in Canada and the United States.

He is survived by two sons, Clare D. Floyd of Excelsior, Minnesota and James A. Floyd of Toronto, Canada. Mrs. Floyd, the former Stella Davis, preceded him in death in 1943.

WINFIELD GEAR

The many friends of Winfield Gear will be grieved to learn of his death on June 10th in the Corning Memorial Hospital, following a long illness at his home in Tehama, California.

Mr. Gear was born December 25, 1880 in Galt, California. Winfield became interested in beekeeping at an early age and was known for his wide experience in the fundamentals of beekeeping and queen rearing not only in California but also in Canada. For the past thirty or more years he had engaged in the business of rearing package bees and queens and the quality of his queens was appreciated as far away as Australia. He was always ready to help those who came to him for help and advice and cooperated with his fellow beekeepers for the betterment of the industry. He maintained his lively interest in bees to the very last.

Mr. Gear is survived by his wife who was Miss Isabella Brown before their marriage in Taber, Alberta in 1938, and by their three children Bob, 20, Paul, 17, and Katherine, 14. Mrs. Gear worked with her husband in the bees for many years and will continue to operate for package bees and queens with the aid of her children until the boys are able to take over. She is well qualified to maintain the high quality of the bees and queens and to give satisfactory service to their customers, some of whom have ordered packages and queens without a miss for over 30 years. We all wish her well.
Dr. J. E. Eckert

Obituaries—

FRED GOULD

Fred Gould, 60, Angola, Indiana, died at his home at Crooked Lake at 11:15 p.m. Wednesday, April 12. Although he had been in ill health for several years, his death came suddenly and unexpectedly.

Mr. Gould had been interested in bees since boyhood. He and his son, Robert, have been operating over a thousand colonies of bees in southern Michigan and northern Indiana. He was also associated in the bait business near Angola, with his two sons, Robert and Lloyd. Mr. Gould had gained nation wide recognition for his ability in preserving and packaging fish-baits of all kinds. He was the holder of U.S. patents on processing and packaging and was the first to introduce and commercially produce the now popular wax worm, or as known to some, the bee moth to the fishing world.

D. T. Winslett

We regret to announce the death of one of California's old reliable queen breeders, D. T. Winslett of Citrus Heights. Mr. Winslett had been a large breeder for a number of years besides operating bees for honey and for pollination. Our sympathy extends to his family.

It is our understanding that the outfit is to be offered for sale.

FEDERATION ACTIVITIES

Honey Booth at Home Economists Convention June 27-30. The honey booth at the American Home Economist Association Convention was again sponsored by the Federation and other industry Associations. This convention was held June 27-30 at the Cleveland, Ohio, Public Auditorium.

Booths at this convention are eagerly sought by exhibitors. The fee for booth space is about $300.00. Over 4,000 home economists attend these conventions. The entrances to the convention are carefully guarded and no one who is not registered can enter and see the exhibits or attend the meetings.

Gifts of honey and free honey recipes are given to these home economists. This booth has been one of the most popular of the convention in past years.

Mr. and Mrs. Claire D. Floyd and family of Excelsior, Minnesota, have prepared this fine booth for many years without charge for their time.

National Honey Show to be August 25-Sept. 3 at Des Moines. The Iowa State Fair will be host to the 1961 National Honey Show. It will be at Des Moines, Iowa. Cash prizes totaling $660.00 and trophies worth $250.00 will be awarded to the winners and other exhibitors who place well in this show.

Every beekeeper is urged to send honey, wax, and baked goods to this fair. You not only might win some money, but you will help publicize the bee industry by helping make this a good and large show. For details on prizes and how to enter write to Glenn Stanley, Superintendent, Apiary Department, Iowa State Fair, Des Moines 19, Iowa.

Another $5,000 claim paid to group life insurance member. A payment of $5,000 has been paid to Maurine Brown of Gardner, Illinois. Her husband, John D. Brown, passed away on May 14 from a heart attack. He was a charter member of the Federation group life insurance plan.

Join your growing Federation. The Federation needs your help to keep growing and to serve the bee industry better. Send in your dues today if you are not a member and help us keep growing. Minimum dues are $5.00 with 4c a colony suggested dues for large beekeepers.

Amendment To Act On Importations

To amend the Act relating to the importation of adult honeybees.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section 1 of the Act of August 31, 1922 (42 Stat. 833; 7 U.S.C. 281), is amended to read as follows:

"SECTION 1. In order to prevent the introduction and spread of diseases dangerous to the adult honeybee, the importation into the United States of all honeybees of the genus Apis in the adult stage is hereby prohibited, and all adult honeybees offered for import into the United States shall be destroyed if not immediately exported: *Provided,* That such adult honeybees may be imported into the United States by the United States Department of Agriculture for experimental or scientific purposes: *Provided further,* That such adult honeybees may be imported into the United States from countries in which the Secretary of Agriculture shall determine that no diseases dangerous to adult honeybees exist and that adequate precautions have been taken by such countries to prevent the importation of honeybees from countries where such dangerous diseases exist, under rules and regulations prescribed by the Secretary of the Treasury and the Secretary of Agriculture.

Minnesota Plant Industry New Address

The Division of Plant Industry of the Minnesota Department of Agriculture, formerly at 312 Coffey Hall, University of Minnesota's St. Paul Campus, has now moved to the 6th floor of the State Office Building, St. Paul 1, Minnesota. The main office is in Room 670.

Donald M. Coe
Director

Gochnauer To Canada

T. A. Gochnauer, who has done such fine work at the University of Minnesota on the treatment of diseases of bees during the past few years, has severed his relations with the University. Dr. Gochenauer, in an editorial in the May issue of the Minnesota Beekeeper, for which he has acted as editor, gives a survey of

the work he has done and cooperated in while at the University.

Dr. Gochenauer will go directly to Ottawa with the Canadian Department of Agriculture. He will be Dominion Apiarist, a position only temporarily filled since the death of Dr. C. A. Jamieson. Our best wishes go with Dr. Gochenauer. We know that he will be a definite addition to Canadian beekeeping.

Wisconsin Honey Queen Sends Honey To The Kennedys

Miss Mary Tyriver of Neenah, Wisconsin, Wisconsin's 1961 Honey Queen, presents Mrs. Alexander Wiley, wife of Senator Wiley of Chippewa Falls, a special box of Wisconsin Honey as a gift for President and Mrs. Kennedy with the compliments of the Wisconsin State Beekeepers' Association.

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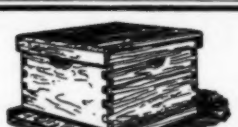

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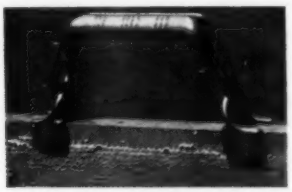

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Crop and Market

by M. G. Dadant

THE CROP

The crop so far is, of course, not yet far enough advanced to compare favorably but reports so far seem to have added up pretty well with Florida about as much honey as a year ago and Georgia considerably more. Extending up the East Coast, the crop ranges seem to be somewhat above a year ago but starting with New England and drifting eastward, the extremely uncertain weather has at least delayed the crop and in many instances may have shortened it. That seems to be the concensus of opinion extending clear through into Indiana and even into Illinois and Michigan.

In the South Central area, the crop probably will be as good as last year and perhaps considerably better in Kentucky and Tennessee although less in Arkansas, less in Louisiana and considerably less in Texas.

The Great Plains states, particularly in the northern sections, have been badly affected by the drought so that Minnesota, North Dakota and western sections of South Dakota, together with Montana and even extending into Idaho, the early crop reports are much under a year ago and rain badly needed.

Colorado seems to be coming along with much more than a year ago which was short although we have no report from the San Luis Valley.

Arizona and New Mexico may be as much as last year, Washington and Oregon the same, but California even though they had a poor crop last year, may have even less. This applies particularly to the southern and central areas. Farther north where the crop depends largely upon irrigation, it seems that the crop may be perhaps just a bit better than a year ago but California certainly will not end up with anything like a boom crop which might affect the eastern areas when the crop is harvested and shipped.

PROSPECTS

On this basis, prospects still appear favorable in the entire eastern half of the country providing the weather settles and allows the bees to get out. Conditions are very spotted. Some people report the heaviest crop ever, others either drought or rains interfering. General rains about July 15 to 20 seem to have improved the position of the Central and even the Southern areas for any late crop that might develop and even in the Dakota area, the crop may have been materially benefitted by late rains if they came early enough and plentifully enough. Canada is about in the same spot as the United States. The eastern provinces about like last year with undetermined weather, whereas western provinces have suffered from drought and are still suffering unless rains have lately fallen. These late rains while of benefit can never push back the time so that bees can equal what they got a year ago. The same condition is apparent in British Columbia in the internal areas. Along the coast, conditions there are usually excellent as they are in Oregon and Washington except for perhaps too much rain at times.

While it is too early to give any suggestions on what the crop might finally be, it would be our opinion that the total crop will not equal last year although perhaps may range near it if developments from July 20 on are satisfactory and the rains have been general.

Bumper areas like Nebraska, western Iowa, southeastern South Dakota and perhaps a little of southern Minnesota and the possibility of a bumper crop by beekeepers in many of the central states, to an extent is balanced by very unfavorable reports from neighboring beekeepers in the same general areas.

All in all, it does look like a real bumper crop season was much interfered with by drought in places, by cool unfavorable weather in other places, and by bees which were not in condition for the crop owing to the other two phases mentioned above.

BUYERS

Contrary to this time a year ago, buyers have not been active up to July 20 although some packers seem to be running very close on honey. It is apparent that buyers have been made cautious by the fact that they perhaps paid just a bit more early in the season last year than they had to pay later on and that the influence of the Argentine crop did definitely break the market.

On the whole, buyers are not active. We have reports in central and eastern areas of the same prices as last year, some ranging as high as 13 cents to 15 cents f.o.b. producer's honey house. Report of one or two small lots of white honey moving at 15 cents and in Colorado, just the opposite, some prices still at 12½ cents which is nearly 1½ below what it was at this time last year.

On the whole, however, buyers who are not active are "going to look and see" before they buy too quickly. So we would say that activity has not yet reached the beekeeper and as well on July 20 very little honey was ready for the market as the clover crop was dragging along due to cool weather and in many cases damp weather, too bad for the bees to get out regularly.

PRICES FOR 1961

On the whole, we do not believe there will be the optimism on the part of buyers that there was a year ago so that the market is apt to start off "draggy." This is just the opposite of what it was last year when our suggestions were that if a man could get his price, he should sell promptly. Now it looks like it might be the best thing to "wait and see" just like the buyer is going to do.

It is most certain that the advance in support price by the U.S.D.A. has had its effect and has meant a definite advance in the proposed prices for honey paid by buyers. One stumbling block yet is whether or not the Argentine honey is going to affect the market late in the year as it did a year ago. No doubt the Argentine honey has largely been cleaned up in that country so the new crop will have to be ready to market before there will be any difficulty there as their season, of course, is just the opposite of ours and the honey crop comes in the winter months.

On the whole, although the market is starting off "draggy" and perhaps a little lower than it was at this time last year, we look for a rising tendency instead of the opposite as we had in 1960-61 when a few beekeepers who held for a price of above 15 cents, were disappointed.

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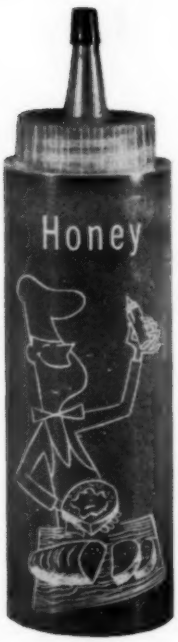

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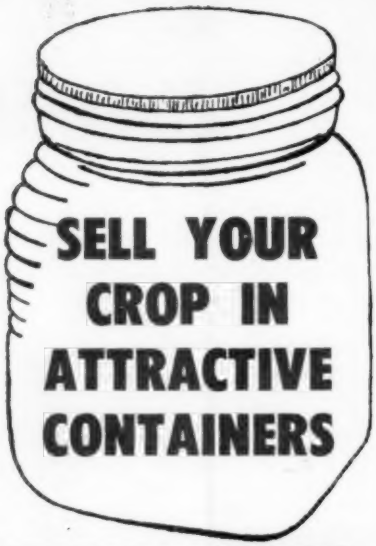

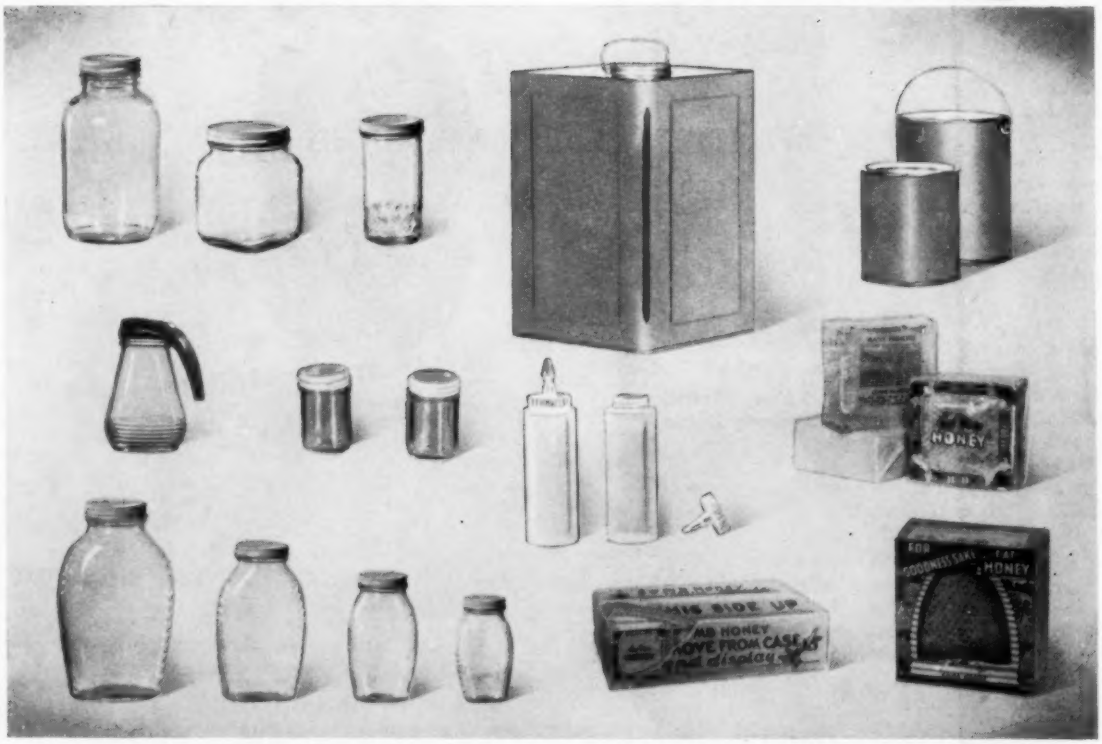

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